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REMINISCENCES OF THE OLD NAVY.

THE FATHER OF MODERN CLIPPERS AND AN ANTIQUATED MODEL.

IF my memory serves me correctly, some time during the year 1842, after an act of Congress had abolished the Board of Navy Commissioners, the Department directed the six naval constructors stationed at the several navy-yards to build, each after his own model, a sloop-of-war of about one thousand tons burden, which order resulted in furnishing the service with five of the finest ships of their class in the world; the sixth, named the "Albany," constructed at the Brooklyn, New York, yard, was also a superbly-built vessel, but her model was of a character which would necessarily send her to the bottom, unless carefully watched and properly handled,—a fate which actually befell her in 1854, during a passage from Aspinwall, New Granada, towards New York. From personal knowledge of this ship, and the ignorance of the laws of storms prevailing at that period, my theory regarding the disaster has ever been, that in the cyclone she must have encountered while crossing the Caribbean Sea (for it is well known that one of great violence swept over that body of water four days after the "Albany's" sailing) she was "hove to" on the wrong tack, and the furious wind, incident upon the storm's centre passing the ship, caught her aback and sent her under, stern foremost,—a result for which her after-body was peculiarly adapted.

The "Albany" was constructed upon the expanded lines of the brig "Somers," which vessel capsized in a squall off Vera Cruz during the Mexican war, carrying a large number of valuable lives down with her.

Among the six ships produced at this time were two more noted than the others,—one, the "Jamestown," owing to the revolution she created in ship-building, and the other, the "Portsmouth," from the

antiquity of her model, I have selected for the subjects of this article. Foster Rhodes, Eckford's foreman, and, after the death of that celebrated naval architect, the chief constructor for a time of the Turkish Empire, on his return to the United States, received a naval constructor's appointment in our own navy, with an assignment to duty at the Portsmouth, Virginia, navy-yard.

This gentleman being somewhat "ahead of the times," decided upon a new departure, and arguing upon the principle that a ship did not require breadth of beam for stability, but length of keel only, laid down the "Jamestown's" lines, giving her a total length over all of one hundred and eighty-eight feet, with thirty-six feet as the greatest breadth, being one foot longer than the frigate "Raritan," and only four feet shorter than our largest frigate afloat at that time.

When launched and rigged, with her short lower masts, taunt topmasts, remarkably square yards, and with the tremendous rake given to her masts, she certainly was the longest-appearing and most rakish-looking craft ever seen upon the water.

Both the "Jamestown" and "Portsmouth" were considered about the fastest sailers of their day; and in the trial off the Capes of Virginia, made in 1844, they appeared about equal, the officers on both vessels claiming the victory, a slight preponderance apparently being in favor of the latter vessel; but, while the "Portsmouth" could carry her topgallant-sails, and, if necessary, fight both batteries advantageously, the "Jamestown," under similar canvas, careened to such a degree that her guns were of no service whatever.

Constructor Rhodes, who was on the latter vessel throughout the race, manfully acknowledged his error, and deeply regretted not giving his ship more beam. For war purposes, the trial proved the "Portsmouth" to be the superior vessel of the two.

The "Jamestown's" first cruise on the coast of Africa, as flag-ship of Commodore Skinner, was a decided success; but on her return to Boston, owing to the commodore's recommendation, her masts were righted, yards shortened, topmasts reduced, and by these changes she lost her early prestige as a sailer, which she never afterwards regained.

In the spring of 1847, the Emerald Isle being devastated by famine, large contributions of provisions were made for the sufferers by people in the United States, and the frigate "Macedonian," together with the sloop-of-war "Jamestown," stripped of their guns, were designated by the government to carry breadstuffs to that unfortunate island. Donald McKay, of New York, was assigned to the command of the former, and R. B. Forbes, of Boston, a prominent ship-master and builder, to the latter, both gentlemen volunteering their services for this laudable purpose. Captain Forbes, a gentleman of high attainments, a thorough sailor, and at least half a century in advance of the period, finding his new command, which now carried her cargo in the hold instead of on

deck, something different from any craft he had ever before had under his feet, carefully watched and noted her every movement during the entire voyage out and back. The "Jamestown" on this occasion did not make a very remarkable trip, that being a matter principally dependent upon the wind; still, her performances were of a nature to keep her intelligent commander constantly surprised, and perhaps at no time more so than when bringing the ship to an anchor off the Charlestown navy-yard on his return. Being short-handed, Captain Forbes essayed the accomplishment of that object in true merchant-ship style, and clewing up the fore- and mizzen-topsails, laid the main flat aback, which in any other ship would have deadened her headway immediately; but the "Jamestown," unmindful of such a trifle, held her way, evidently bent upon going up into the yard; to counteract which the helm was thrust to starboard, causing her to sheer up Charles River, and when on the eve of demolishing Charlestown bridge, was brought up by letting both bow-anchors go under foot, with the head-booms projecting over the bridge and the dolphin-striker just clearing the railing.

With the new ideas created in his brain, Captain Forbes, after turning the vessel over to the naval authorities, went to his place of business in South Boston and laid down the lines for a vessel afterwards known as a half-clipper, which was quickly followed by a model for the first of that celebrated class of ships which produced a "Flying Cloud" and other kindred vessels.

If, therefore, the intellect of Captain R. B. Forbes, of Boston, through his close observance of the "Jamestown," originated ideas producing those remarkable vessels designated clippers, surely the United States sloop-of-war "Jamestown" is entitled to the credit of being the father of these clippers.

We now turn to the sister ship, the sloop-of-war "Portsmouth," framed at the Kittery, Maine, navy-yard, after a model furnished by Mr. Josiah Barker, the naval architect at that station, and constructed by that gentleman. The origin of this model is sufficiently remarkable and curious to merit special mention, otherwise probably this article would never have been written. Mr. Barker, on receiving the order to construct a sloop-of-war after his own design, invited a friend, the civil engineer of the yard, into his office, and informed him as follows: "I have received directions to build a ship of one thousand tons. I am seventy-two years of age,—too old a man to keep pace with the new-fangled notions of the present day, but I will build a ship upon the expanded lines of the old ship 'Union,' and give the people a vessel that will astonish them. The history of the model I have under consideration," he continued, "I will give you. In 1798 I was a ship-builder, and the owner of a ship-yard in Boston, and one day a French bark, eighty years old, of about one hundred and fifty tons, and leaking badly, came to my yard for repairs. On hauling her out on the ways

I was struck with the remarkable beauty of her lines under water, and during the repairs carefully measured and produced an excellent model of her. Several years afterwards, about 1805, a Salem firm contracted with me to build them a ship of five hundred tons for the East India trade. Enlarging the Frenchman's lines, I produced a vessel of the required size called the 'Union,' which, for speed and admirable sea qualities, was unsurpassed in that day. She made the most extraordinary passages to and from the Indies, outsailing everything she fell in with on the ocean, was immensely profitable to her owners until the war of 1812 put a stop to her trade, when she was converted into a privateer, and proved one of the most fortunate of that class of vessels sweeping the ocean during the continuance of hostilities. The 'Union' roamed the seas with impunity, easily overhauling any vessel she thought proper to chase, and as readily showing her heels to any one she was desirous of avoiding. Altogether she was the most remarkable ship of her time, and having survived the war and made her proprietors rich, she at last became worn out, and was sold and broken up. Such is the history of the model," continued Mr. Barker, "upon whose expanded lines I intend to build the new ship," which, when launched, was christened "Portsmouth," and afterwards fully equaled the expectations of her builders.

The "Portsmouth" was one hundred and sixty-seven feet six inches long by thirty-eight feet three inches beam, and for speed, ease, and dryness in heavy weather, carrying her batteries, weatherly and seagoing qualities generally, had not her superior in the world. She made some of the quickest passages on record, and in the Pacific sailed for six days over the "Flying Cloud's" track, and beat that ship's time. On several occasions, owing to her remarkable weatherly qualities, she worked out of tight places where almost any other vessel would have been lost.

This ship was closely identified with the early history of California, taking a fair share of the stirring events which gave the Pacific slope to our common country, giving her name to the principal square in the new city situated by the Golden Gate, and her commander's to its principal street. After the declaration of peace she was actively employed on various stations until the navy of steam thrust her into the background, and at present she forms a part of the Training Squadron off Newport, Rhode Island. From the foregoing bits of resurrected history it appears, that owing to the departure of one naval constructor from the prejudices of the times, and the renewal of a model one hundred and twenty-five years old, the United States navy acquired two of the finest specimens of naval architecture that ever displayed her flag upon the ocean.

THOS. S. PHELPS,
Commodore U.S.N.

ROPES ON GAINESVILLE.

THAT Mr. Ropes, in "The Army under Pope," has given a conscientious and impartial account of the ill-starred campaign of '62 seems generally admitted. At all events, no positive disclaimers have appeared, and to all intents and purposes his views of the engagements of the 28th, 29th, and 30th of August around Manassas will go down to posterity as historical fact. He has bestowed well-earned praise in many a case where praise was due, and in his censure he has been courteous, and, more than that, has shown evident disinclination to censure at all where, as a military critic, he could avoid it.

Perhaps it is for this reason that I feel so keenly his condemnation of the withdrawal of King's division the night of August 28, after the fight at Gainesville, and, late though it may be, it is the purpose of this article to set forth the motives which led to that move, and possibly to establish the fact that the responsibility for that "uncalled for and unmilitary retreat" did not rest solely where Mr. Ropes places it,—upon the shoulders of General Rufus King, long since defenseless in his grave.

A brief narrative of the events of that evening may be in order. King's division, as Mr. Ropes says, had brought up the rear of McDowell's column on the 28th, had marched through Gainesville, and, in accordance with its orders, had left the Warrenton Pike and turned off to the right *en route* for Manassas. The entire division was well clear of the road when its march was arrested by General McDowell, and for some time the men rested along the roadside, and in Gibbon's brigade, taking advantage of the halt, the regimental butchers went to work slaughtering their cattle and distributing fresh beef. It was five o'clock when "attention" rang along the column, the ranks were reformed, and the command rapidly retraced its steps and once more appeared upon the pike. "March your division to Centreville by the Warrenton Pike" were General King's orders from McDowell, and obedient thereto, he rode back to what had become the head of column.

Four fine brigades constituted his command that afternoon, and as in long column they resumed their march upon the broad thoroughfare the array was soldierly and disciplined. Colonel Dawes relates that

the evening was so beautiful, and all nature so bright and peaceful around them, that as though by some spontaneous impulse the regimental bands struck up inspiring music, and for a while the march was probably conducted in the cadenced step.

At the head of column rode General John P. Hatch, the senior brigadier, whose command was in its proper tactical position on the right of the line. After his brigade there followed in regular order those of Generals John Gibbon, Abner Doubleday, and M. R. Patrick.

When General King retook the pike he had not the remotest idea of the proximity of Jackson's command. It was believed to be beyond Bull Run and up towards Centreville, for all that morning from the high grounds back of Gainesville he and his staff had searched for signs with their field-glasses, and far as they could see no dust was visible, and not a vestige of flankers or skirmishers. As for our own troops, he knew that Ricketts was back near Thoroughfare Gap, and that somewhere, out of sight ahead, were the commands of Sigel and the little division of Pennsylvania Reserves commanded by John F. Reynolds.

Nearing Groveton, General King had halted to observe the march of his men. Hatch's brigade passed on. On the left lay a thickly-wooded patch, with open fields to its east and west. On the right the clearings were few and far between, the woods thick and tangled. It was six o'clock as Hatch rode out opposite the open field east of the wood, and there Captain Houston, of the engineers (aide-de-camp to General McDowell, and specially detailed that day to accompany King's division), pointed suddenly to the left and exclaimed, "General Hatch, there's a battery!" Nearly a mile to the north some dark objects on a slope had caught his eye, and the long shadows on the sward indicated to him with the quickness of thought that the movement "in battery" was being executed.

General Hatch gazed a moment through his glasses, says Houston, shook his head, said "only cattle," and moved on. As the advance of Gibbon's brigade neared the same spot Hatch's entire column had disappeared from sight over a rise in the turnpike towards Groveton.

Suddenly there came the roar of cannon from the left, and Gibbon's brigade found itself the target of the very battery Houston had discovered. Gibbon's own old battery, "B" of the Fourth Artillery, was bringing up his rear, and in an instant he had dispatched an aide, and his practiced gunners came thundering up at a gallop. To put them in position and to open fire on his assailants was with Gibbon the work of but a minute, and then, ordering the Second Wisconsin to follow him, he plunged into the wood to his left, intent on the capture of the rebel guns. No rebel supports were in sight. The Second followed a winding wood-road a few hundred yards, and were deploying, when from the grass and weeds in their front came the rapid and well-directed

fire of a line of skirmishers. The Second quickly threw out its own skirmishers, drove the rebels from their cover, and continued to advance, while General Gibbon sent back for the rest of his brigade. It was fully twenty minutes before they were up in line, and then, to the utter amazement of the command, there issued from the woods in their front and from behind the slopes five magnificent brigades, the very flower of the Southern infantry, the hard-marching, hard-fighting, perfectly-disciplined footmen of Stonewall Jackson. In three lines their confident array swept forward upon the slender rank of Gibbon's brigade. His formation was not even completed, but he had three of the noblest regiments Wisconsin ever sent forth, and Sol. Meredith's plucky Nineteenth Indiana, and not a thought of falling back entered his head. The instant they came in range the astonished rebels were greeted with a withering fire against which they could make no headway. They halted, opened fire, and then once more, urged on by their commanders who could not understand how that thin line of Yankees could stand before them, resumed their advance, a gallant and determined effort, but still fruitless. The sun was setting as they came on, and the commanding officer of the Seventh Wisconsin, Lieutenant-Colonel Hamilton (the colonel and major having already been wounded and carried to the rear), finding his regiment completely lapping the enemy's flank, quickly changed front forward on his tenth company and poured in a rapid enfilading fire. It was one brigade against five, and the one had the best of it.

But that sort of thing couldn't last long. Jackson was there in person, Ewell and Taliaferro were men not accustomed to be held at bay, and with renewed vigor the attack was resumed. Gibbon sent back to the pike for reinforcements, and Doubleday's brigade was hurried up to the front. Meantime, General King, realizing that he had Jackson's entire corps on his flank, had sent an aide to recall Hatch, and set about supporting Gibbon. Doubleday's brigade continued its advance along the pike, and two of his regiments were thrown forward, filling up the gaps in the rapidly-thinning line of the Wisconsin men. But all this had taken time, and Gibbon had fought a full hour unaided.

The rebel attack weakened in force at twilight, and with darkness ceased entirely, though sputtering shots seem to have been exchanged between the lines as late as nine o'clock. By the time the division was massed there was no further attack to repel. Gibbon and Doubleday held the exact ground to which they had advanced, and the rebel lines were drawn in. It had been a desperate, stand-up, give-and-take fight of two hours' duration, and the reluctant praise from Jackson's lips, that we had held our ground with "obstinate determination," was well earned. Forty per cent. of Gibbon's brigade lay dead and wounded in their tracks, and Doubleday's two regiments had suffered severely.

Hatch and Patrick had not been engaged. Had the fight lasted half an hour longer, they too would have had their hands full.

At nine o'clock General King set about gathering in his wounded, and dispatched staff-officers in search of General McDowell, his immediate superior, to notify him of the result of the action and to request instructions.

Prisoners began to be brought in, and there was now leisure to examine them. All asserted the same thing. Jackson's entire corps was in his front, and General King had now not more than six thousand five hundred effective men in his command. This looked serious. He had good reason, as Mr. Ropes says, to "feel himself to be in a somewhat critical position."

As known to him that night, upon whom could he rely for support? Ricketts he believed to be way off towards Thoroughfare Gap. Ropes says he had "retired after dark and reported the imminent advent of Longstreet in the morning;" but, up to midnight, King did not know how far away his brother division commander was, though he had reason, from the prisoners' statements, to expect Longstreet. On his right and rear, some distance away towards the Sudley Springs road, he knew to be the little division of John F. Reynolds, for that energetic soldier himself had made his way through the forests at nightfall following the sound of the cannon, had emerged on the pike as Doubleday was coming up to the support of Gibbon, and was a spectator of the close of the engagement. Then he had a conference with General King, and King told him that he meant to hold his ground. Reynolds afterwards told General Gibbon that he left King with the promise that he would come up to his support at daylight. King and his staff-officers remember Reynolds saying, as he rode away in the darkness, "Whatever you decide to do, remember that I am on your right," but that is all. Where Sigel was King did not know, and the only probable support on which he could rely was Reynolds's little division of two thousand five hundred Pennsylvanians. All told, he could count on less than ten thousand men to withstand Jackson's seventeen thousand. Nevertheless, when Reynolds left him he meant to stick to it.

But at one o'clock in the morning we know that the division silently marched away,—not, as Ropes says, by way of Gainesville, but by the wood-roads leading towards Manassas Junction. Knowing what we know now, there is no defense for the move. The campaign was lost right there; but is it fair to judge a man in the light of events as we know them now? Let us look at the reasons which actuated him then.

Late that night, King and his four brigadiers met in council on the field. Not a word had been heard from McDowell or Pope. No one knew where they were. The only thing that any one of their number

could be morally certain of was that Jackson, with overwhelming force, would be on them with the earliest dawn, and that even if they could stand him off till Reynolds with his little command could reach them, what then? The rebels had fought with a dash and spirit that showed them to be utterly unhampered in flank and rear. In plain words it looked like this: It means annihilation if we stay here, whereas by crossing the pike and moving off towards Manassas, the chances are that we will come upon supports.

Captain Houston, of McDowell's staff, was sent to strive to find his chief and report the situation to him. He never found him till three the next afternoon. At daybreak he stumbled upon General Pope's camp, and reported to him, but before leaving he had been called upon, as McDowell's representative, for his opinion, and gave it. "General King, you must get out of here. That's certain." Then the generals gave their views. First to speak was Gibbon, as daring and courageous a soldier as the army contained, and he was simply vehement in his reasoning. Patrick, Doubleday, and Hatch, all gallant soldiers, said their say. The opinions were well-nigh identical. One and all urged General King to fall back and save his fine division from the imminent destruction that awaited them with the rising sun. Not one of them would do it to-day; but this is what they thought then. Ropes says "that it may be that his (King's) nerve gave way that evening, and hence his unmilitary retreat." It is true that his health completely broke down the next day. It had been failing a week; but if his nerve gave way it was not until Gibbon's had gone, and who ever heard of Gibbon's nerve failing him? Let me quote the outspoken general's own words, written to General King on this very subject:

"I deem it not out of place to state that that retreat was suggested and urged by myself as a necessary military measure, and that the movement was approved by two others of your brigadier-generals present at the conference.

"I am free to admit that the movement, had it been ordered by a senior officer cognizant of the position of the rest of our troops, and having the requisite authority to make a proper disposition of them during the night of the 28th, it would have been a grave military blunder; *but as no such officer was present,*[1] I do not hesitate to say, and it is susceptible of proof, that of the two courses which I considered open to you, of obeying your orders to march on Centreville or retreat on Manassas on your own responsibility, the one you adopted was the proper one. *Having first suggested the movement, and urged it on military grounds,*[1] I am perfectly willing to bear my full share of the responsibility, and you are at liberty to make any use of this communication you deem proper.

(Signed) "JOHN GIBBON,
"Brigadier-General Volunteers."

Mr. Ropes says that General Pope was surprised and indignant at King's falling back. If he was, he does not betray it in the following extract from a letter he wrote to General King:

[1] The italics are mine.

"You will notice that I state that your withdrawal was made necessary by the absence of Ricketts's division at Thoroughfare Gap, a fact which I did not know till afterwards. *The great cause of the whole trouble was the absence of McDowell from his command,*[1] induced by the best motive in the world,—the desire to see me and communicate information concerning the country. *It was far from my intention to imply, even, that any blame attached to you in the matter.*" [1]

If anybody had a right to blame General King it was General Pope, who had everything well arranged "to bag the whole crowd," and who was doubtless bitterly disappointed; but if Mr. Ropes had considered a little more how utterly "the best intentions in the world" had served to complicate matters about this time, it is possible that the corps, not the division, commander would have been held primarily responsible.

On page 81, referring jointly to King and Ricketts, Mr. Ropes says, "They knew, therefore, that against the three divisions of Jackson's corps they could, at daybreak, unite their own divisions, Reynolds's division, and the two divisions of Sigel." King did not know it, and Ricketts, way to the west, could not have known it. King's idea of Sigel's position was that he was somewhere along Bull Run, and Reynolds could not or did not definitely locate him on the Sudley Springs road. As for concert of action between King and Ricketts, there was none. The latter was way off towards Thoroughfare Gap when the action was fought, himself retiring before Longstreet. He was marching in to Gainesville late at night, and there received what I believe to have been his first message from King,—that he was going to fall back at one in the morning. Then Ricketts had to go, or else stay out there in the air midway between Longstreet and Jackson. As for King, I have never been able to find that he received any word from Ricketts that night. And right here a point that others, not Ropes, have mentioned occurs to me. It has been asserted that King was ordered by Pope to hold his ground. No order, message, or communication reached him that night from Pope, McDowell, or any other superior. Reynolds was the only man outside his own command with whom he had any communication on the subject.

As to uncovering Reynolds when he fell back, as Mr. Ropes alleges, there was no great harm done. Reynolds's line was a mile or more back in the woods and well off towards Sigel. He was safe enough, and was duly informed of the move. Soldier that he was, the first break of day saw him pushing ahead to the pike to find what had become of the enemy of the night before.

And now one word as to the closing sentence of Mr. Ropes's chapter on Gainesville. Fitz-John Porter had nothing in the world to do with that fight. No soldier ever alleged that he was in any way responsible

[1] The italics are mine.

for the retreat. On the other hand, the Louisville *Courier-Journal*, the Cincinnati *Gazette*, some other papers that I have heard of, and finally Mr. Ropes, with a singular similarity of verbiage, have reproachfully remarked of King and Ricketts, "And yet they sat on Fitz-John Porter's court-martial."

Now just why they should all resort to this form of statement is perplexing, unless their object was to convey the idea that it was a very officious and improper piece of business on the part of King and Ricketts to sit in judgment on their brother-officer when they themselves had been censurable for military blundering. One would really suppose that they had volunteered for the unpleasant duty, for no Porter organ seems to take the trouble to state that they were detailed or ordered to sit on the court. Soldiers know that they had no volition in the matter, but I am tired of the repetition of this slur at my father's expense,—"And yet he sat upon Fitz-John Porter's court."

General King doubtless made a bad move in quitting the field the night after Gainesville, but he did it only at the urgent solicitation of his brigade commanders; and as for his subsequent appearance as a member of that distinguished court, it was not such a bad thing for Porter.

CHARLES KING,
Captain U.S.A.

NOTES FOR A HISTORY OF STEAM NAVIGATION.

(Continued from page 250.)

IX.

1851–59.

1851.—The screw steamship "Himalaya," which in the course of construction excited considerable interest, was launched on the anniversary of the queen's birthday, 1851. The launch was witnessed by the directors of the Peninsular and Oriental Company, for which the vessel was built, and a noble and fashionable assembly. The naming was by Lady Matheson, wife of Sir James Matheson, chairman of the company. On a given signal, shortly before high tide, the vessel glided gently into the water, amid the cheers of the spectators.

The "Himalaya," designed and built under the inspection of F. Wattman, Jr., at Blackwall, was commenced in November, 1850; her length between perpendiculars was three hundred and forty feet; breadth, forty-six feet two inches; depth of hold, thirty-four feet nine inches; and she was three thousand five hundred and fifty tons burden, and had engines of seven hundred horse-power. She was intended to have paddle-wheels, with engines of twelve hundred horse-power, but before she was too far advanced it was decided she should be fitted with a screw propeller and engines of seven hundred horse-power on the most approved principle. She carried twelve hundred tons of fuel, with accommodation for four hundred cabin passengers, five hundred tons measurement goods, and had ample space for mail-rooms, etc. In strength of build and form for speed, the "Himalaya" was at that day unrivaled, having six water-tight bulkheads, and she was fitted with every appliance for safety. She was provided with "Trotman's improved Porter's" anchors, the bower-anchors weighing respectively forty-eight and fifty hundredweight, in lieu of ordinary anchors of five tons each. The cabin arrangements with regard to ventilation were effective, and combined elegance with simplicity.

1852.—The magnificent side-wheel steamer "Francis Skiddy," which plied between New York and Albany in 1852, was built by

George Colyer. She was three hundred and twenty-five feet in length, thirty-eight and a half feet beam, eleven and a half feet depth of hold. Her engine was of one beam, seventy-inch cylinder and fourteen-feet stroke. Her water-wheel was forty feet in diameter, twelve-feet face, thirty-three-inch bucket. She had four low-pressure boilers, twenty-four feet long, nine-feet face, capable of seventy pounds of steam, with a blowing-engine attached to each of twelve-inch cylinder and twelve-inch stroke. Her consumption of fuel was two thousand pounds per hour. Her draught of water, five and a half feet. As a provision against danger, she had three fire-pumps,—two to work by hand and one by steam, with six hundred and fifty feet of hose attached, together with five buckets, a life-preserver for every passenger, and a supply of Francis's metallic life-boats, etc. Her appointments were magnificent. The main cabin, three hundred feet in length, was capable of seating five hundred people, and was arranged in the most commodious manner. There was also an immense saloon, opening upon sixty state-rooms. This was surmounted with a dome or arch, decorated with stained glass, which cost ten thousand dollars.

In 1852 the "Australian" was the first to make the mail steam voyage from England to Australia. She was built at Dumbarton, by Messrs. W. Drury & Brothers, for Messrs. Cunard & Co., for the Canadian trade. She left England on her first voyage June 5, 1852, and returned January 11, 1853, having completed the voyage in two hundred and twenty-one days, one hundred and sixty-five of which were under steam and sails, and fifty-six in port, taking in mails, coal, and lading. The following account of her voyage *out* is extracted from *Chambers' Journal* for 1854:

"The public mind was excited to a pitch of feverish anxiety concerning the gold discoveries in Australia, and in order to provide for the delivery of mails to and from the colony with greater speed and regularity, a company was formed, pledged to effect this by a line of great steamships. Even then, people who ought to have known better confidently predicted that direct steam communication with Australia was impracticable. As in the case of crossing the Atlantic, nothing would convince them, or settle the question, but actual performance. Now, as the distance to be run is little short of sixteen thousand miles, it is obvious that no ship, unless of enormous size, could carry sufficient fuel to perform the entire voyage under steam, without stopping to take in coal at stations on the way; and this has caused hitherto considerable delay and great additional expense. The pioneer was the 'Australian,' a large new Clyde-built iron steamship, that first started from London, and after some accidents and delays, finally left Plymouth with the mails on the 5th of June, 1852, under command of Captain Hoseason. She anchored at St. Vincent on the 16th to take in coal, which had previously been sent to the depot there from England. This

occupied three days. The ship then proceeded on her voyage, and after coaling at St. Helena, reached the Cape of Good Hope on the 19th July, where she again coaled, sailing from Table Bay on the 22d, and anchored in King George's Sound, West Australia, on the 20th of August. There she received coal from a ship sent out with a cargo from England expressly for her, and a few days afterwards proceeded to Adelaide, which she reached on the 29th, and Melbourne on the 2d of September. This was the first voyage performed by a steamer from England to the antipodes. In some respects it was a badly-managed voyage, much unpleasantness occurring among both passengers and crew, repeated accidents happening to the machinery, and the coal running short between the stations, so that at times the engines stopped, and the vessel had to lie to or proceed under canvas. Nevertheless, it effectually demonstrated the practicability of the enterprise. She was followed by the 'Great Britain,' and steamships now perform with punctuality and dispatch the voyage to and from Australia, calling at the Cape, both on the outward and homeward passage, to land and receive mails and passengers, equal to that which distinguishes the Atlantic and Mediterranean steamers. Taking into consideration the prodigious expanse of ocean to be traversed, this is a triumphant realization of the most sanguine hopes of those who have watched the progress of steam navigation."

The Peninsular and Oriental Company was the first to adopt screw steamers for its regular service. In 1852 the "Chusan," of seven hundred and sixty-five tons, and the "Formosa," of six hundred and seventy-five tons, were placed upon the route between Hong-Kong and Shanghai. These were succeeded by the "Bengal," of two thousand one hundred and eighty-five tons, and the "Candia," of nineteen hundred and eighty-two tons, between Suez and Calcutta.

A Parliamentary return showing the number of vessels of wood and iron belonging to British mail contract steam-packet companies, in March, 1853, was as follows:

Name of Company.	No. of Vessels.			Tonnage.			Horse-Power.		
	Wood.	Iron.	Total.	Wood.	Iron.	Total.	Wood.	Iron.	Total.
Peninsular and Oriental	11	22	33	11,800	26,449	38,249	4,086	7,481	11,567
Royal West India	19	1	20	32,612	2,700	35,312	8,750	800	9,550
British and North America	8	1	9	14,991	2,500	17,491	5,690	1,000	6,690
Pacific	...	8	8	.....	6,688	6,688	.....	2,298	2,298
General Screw Steam Shipping	...	8	8	.....	13,496	13,496	.....	2,250	2,250
Australian	...	5	5	.....	8,600	8,600	.....	1,800	1,800
Southwestern	...	4	4	.....	1,612	1,612	.....	677	677
African	...	4	4	.....	3,920	3,920	.....	530	530
Total	38	53	...	59,403	65,965	.....	18,526	16,836	.....
Grand total			91			125,368			35,362

This table will show at a glance the rapid increase of British ocean steam navigation in the fifteen years that had elapsed since the pioneer voyages across the Atlantic of the "Sirius" and "Great Western."

1853.—Messrs. Caird & Co. launched from their yard at Cartsdyke, in May, 1853, the Royal Mail iron paddle-steamer "Atrato." Early in 1852 the "Demerara," built on the Severn for the Royal Mail Steam-packet Company, was stranded across the river soon after her launch, and so much injured that she had to be broken up. For this ship Messrs. Caird & Co. had the engines ready, and the directors immediately gave orders to construct an iron vessel to be fitted with them. That ship was the "Atrato." To suit the machinery it was requisite to maintain the same width as the "Demerara" had been, but the length was considerably increased. The "Great Britain" was of about thirty tons greater capacity, but the "Atrato" was longer by forty feet.

Her dimensions were:

Length over all	350 feet.
Length of keel and forerake	315 "
Extreme breadth, including wings	72 "
Breadth of beam	42 "
Depth of hold	34 "

The dimensions of the great war-steamer "Duke of Wellington," three-decker, may be stated, by way of comparison:

Extreme length	278 feet.
Length of keel and forerake	240 "
Breadth	59 "
Depth	24½ "

The "Duke" being thus less than the "Atrato" by about seventy feet in length and ten feet in depth; the width of the latter being, from the cause mentioned, less by seventeen feet. The height from keel to top of bulwark-rail was forty-three feet. Her bow was surmounted by a spirited representation of an Indian deity, the work of Mr. Peter Christie, of Greenock.

The "Atrato" had four decks, seven and eight feet respectively in height. The spar-deck was flush from stem to stern, affording a promenade the length and breadth of a good street,—three hundred and thirty feet by thirty-eight. She had two funnels and three masts. The standing rigging was light and graceful, being formed of galvanized iron. The masts were fitted with Sir Snow Harris's lightning conductors. The main- and foremasts were "great sticks" of Quebec pine, the former measuring ninety feet long by seven in circumference.

The keel of the ship was formed of nine enormous pieces of iron, and the stem and stern-posts were each one piece, and both carried besides some distance along horizontally. In the framing and fitting of the paddle-boxes, the beams and stringers, all of patent iron, pre-

sented an extraordinary contrast to the great logs used for the purpose in the other ships. The paddle-spaces were forty feet by twelve and a half wide, the wheels of thirty-seven feet diameter, patent feathering principle. The ship was divided into seven water-tight compartments by iron bulkheads. Thirteen hundred tons of iron were used in the construction of the hull. She was propelled by two beam-engines of the collective power of eight hundred horses, and she had accommodations for two hundred and twenty-four first-class passengers.

July 17, 1853, the "Forforo," a small iron screw steamer of forty-three tons and forty horse-power, rigged as a three-masted schooner, sailed from Liverpool for the west coast of South America, and arrived at Valparaiso November 15. The passage occupied one hundred and twenty-one days,—forty-six under steam and sail, and twenty-eight under sail alone. She used in all one hundred and sixty tons of coal, and averaged six knots all the way. She was the smallest steamer that ever performed so long a voyage.

1854.—In 1854 the English screw-steamship "Argo," eighteen hundred and fifty tons register, returned to England from Australia *via* Cape Horn, being the first steamer that had circumnavigated the globe. She made the passage out to Australia in sixty-four days, and returned *via* Cape Horn in the same time. Since the ancient days of Jason and his "Golden Fleece," several celebrated ships have borne the renowned name of "Argo," and certainly we consider the present steamer not the least worthy of the number to be chronicled in history. She has proved herself one of the most notable pioneer ships of the nineteenth century.

1853–54.—In 1853 the American paddle-wheel steamer "Golden Age" came to Liverpool, where she attracted much notice. She was of great size and power, built with all the latest transatlantic fashions and improvements, one of which was that she literally had no bowsprit!—something our English brothers then thought—though they have learned to know better—as indispensable as the nose on a man's face. Her owners resolved to send her to Australia, and she made the quickest passage out on record, up to that time. But her subsequent voyage was far more memorable and important. On the 11th of May, 1854, she left Sydney, and in thirteen days reached Tahiti, where she took in the enormous weight of twelve hundred tons of coal. This occupied her six days; and on the 31st she sailed direct for the Isthmus of Panama, which she reached on the 19th of June, the passage from Sydney, including the long stoppage mentioned, thus being performed in about thirty-nine days! This wonderful feat was rendered more remarkable from strong head-winds during the first part of the voyage and an estimated current against her course equal to an extra seven hundred and sixty-eight miles. From Tahiti, however, the sea was so smooth and the passage so mild that a canoe might have come the whole distance in safety. She arrived at Panama just in time to transfer two hundred

passengers, her mails, and a million sterling in gold to the West Indian steamer "Magdalena," at Chagres, and consequently letters from Sydney to the 11th, and from Melbourne to the 5th, of May—only sixty-seven days from Sydney!—were received in London on the 18th of July, 1854.

"Thus to American skill and enterprise," says the *Edinburgh Journal*, "credit is due for first opening direct steam-communication across the vast Pacific, in that manner connecting Australia and Europe by the medium of Panama. We cannot read without regret that the spirited proprietors of the 'Golden Age' have incurred a dead loss of several thousand pounds by the experiment, solely owing to the cost of coal at Tahiti. But they have shown what can be done, and nothing can be more certain than that ere long arrangements will be made sufficiently economical to enable a regular line of noble steamships to traverse this novel route, and so bring us within two months' distance of Australia. To quote a newspaper paragraph, 'Ever since Columbus set out across the Atlantic in search of India, it has been the dream of commerce to reach the East by the West, and from the time that Balboa caught a glimpse of the great trans-American ocean from the heights of Darien the world has looked forward to the junction of the two oceans at one point or another as the commencement of a new era in the history of commerce. Nevertheless, the Pacific has hitherto been a field of adventure rather than of regular commerce. Till recently it has been cut off from all direct communication with the trade and civilization of Europe and America. No maritime nations of importance have occupied any part of the extensive line of coast by which it is circumscribed, and within which it has lain in silent repose rather like a secluded lake than a mighty ocean. But a new destiny is beginning to dawn upon it. The "Golden Age" breaks in upon its isolation, and arouses it from its slumbers. She inaugurates an era in which its commerce will probably as far transcend that of the Atlantic as the latter eclipsed that of the Mediterranean.'"

1855.—On the 3d of March, the steamship "Persia," the first *iron* paddle-wheel ship built for the Cunard Company, was launched from the building-yard of Messrs. Robert Napier & Sons, at Govan. This was the largest steamship then afloat in the world, exceeding in length, strength, tonnage, and steam-power the "Great Britain" or the "Himalaya," and also, by twelve hundred tons, the internal capacity of the largest of the Cunard liners of that time. Her chief proportions were as follows:

Length from figure-head to taffrail	390 feet.
Length in the water	360 "
Breadth of the hull	45 "
Breadth all over	71 "
Depth	32 "

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Length from figure-head to taffrail	390 feet.
Length in the water	360 "
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The lines of beauty had been so well worked out in the "Persia" that her appearance was singularly graceful and light. Yet the mighty fabric, so beautiful as a whole, was made up of innumerable pieces of metal, welded, jointed, and riveted into each other with exceeding deftness. The keel consisted of several bars of iron about thirty-five feet in length, each joined by long scarfs, and as a whole thirteen inches deep by four and a half inches thick. The framing was constructed in a peculiar manner to secure the greatest amount of strength. The iron stern-post was thirteen inches in breadth by five inches in thickness, carrying the rudder, the stock of which was eight inches in diameter. The framing of the ship was very heavy. The space between each frame was only ten inches, and the powerful frames or ribs were themselves ten inches deep, with double angle-irons at the outer and inner edges.

The plates, or outer planking of the ship, were laid alternately, so that one added strength to the other, forming a whole of wonderful compactness and solidity. The keel-plates were eleven-sixteenths of an inch in thickness; at the bottom of the ship the plates were fifteen-sixteenths of an inch in thickness; from that section to the load water-line they were three-fourths of an inch; and above that they were eleven-sixteenths of an inch in thickness. The plates round the gunwales were seven-eighths of an inch in thickness.

She had seven water-tight compartments. The goods were to be stowed in two of the divisions. The goods store-rooms or tanks were placed in the centre line of the ship, with the coal-bunkers on each side of them. The vessel was constructed with a double bottom under the goods chambers, so that if the outer were beat in, the inner would protect the cargo dry and intact. The chambers were water-tight, and in the event of accident to the hull the tanks would of themselves float the ship.[59]

[59] In a lecture delivered in England by Mr. William Pearce, of the great ship-building firm of John Elde & Co., on the Clyde, he presented a very forcible illustration of the advance of steam navigation during the last quarter of a century.

He took as a type of the vessels the "Persia," which twenty years ago was the crack boat in the Cunard service, and was sought for, on account of size and speed, by all who contemplated transatlantic voyage. Mr. Pearce pointed out that the highest rate of speed of the "Persia" was thirteen knots an hour, and that in a passage across the Atlantic she consumed six and one-third tons of coal for every ton of cargo she could carry. In opposition to the "Persia" he placed the "Gallia," of the Cunard Line, and the "Arizona," of the Guion Line, as instances of what had been done. The speed that the "Gallia" has made on a transatlantic voyage is fifteen and one-half knots per hour, at a consumption of one-half a ton of coal for every ton of cargo on board. A still more favorable exhibit had been made by the "Arizona," which had made voyages at the rate of sixteen and one quarter knots to the hour, with a consumption of only four hundred and fifty pounds of coal for each ton of cargo in her hold. To bring the comparison down to a simple ratio, a ton of cargo had been transported across the Atlantic by the "Arizona" at less than one-thirtieth the outlay in coal required when the same service was performed by

1856.—By a statement in Lardner's "Museum of Science and Art," it appears that on the 1st of April, 1856, the steam vessels belonging to the Royal Navy were:

	Guns.	Horse-Power.
43 line-of-battle ships	3797	22,950
24 frigates and mortar vessels	889	10,560
90 paddle-wheel vessels	500	24,640
76 corvettes and sloops	761	16,202
47 troop-ships	87	7,300
155 gunboats	580	8,240
435	6564	89,892

1858.—*The "Great Eastern."*—Experience had shown that a sea-steamer of eighteen hundred tons, making the quickest passages to and from England and Australia, with a full cargo and complement of passengers, lost by the voyage from one thousand to ten thousand pounds. A great portion of the expense was from the necessity of supplying coal depots at different points where the steamer could touch during her voyage. These deviations from the shortest route protracted the passage so that clipper-ships made as quick passages as steamers, and at such less expense that they superseded steamers. The problem then to be solved was: Supposing a steamer could be built to move eighteen miles an hour, what ought to be the size of a steamer which could carry out and back fuel for a voyage from England to Australia,—twenty-five thousand miles? To work a steamer profitably it was found that the tonnage must be nearly a ton to a mile. Mr. Brunel, therefore, conceived the idea of constructing a steamer of from twenty to twenty-five thousand tons burden, capable of carrying coals for full steaming on the longest voyage, to be built on the tubular plan, with the screw, the paddle, and also fitted with sail for propelling power. The Eastern Steam Navigation Company was formed with a capital of one million two hundred thousand pounds, in shares of twenty pounds each, with power to increase the capital to two million pounds. The place where she was to be built, on the bank of the Thames at Millwall, consisting of a layer of mud thirty feet thick on a bed of gravel, was prepared by driving more than fourteen hundred piles in lines parallel to the river, as the vessel was to be launched *sideways*. The first plate of the vessel was laid May 1, 1854.

The ship consists of two skins,—an inner and outer skin,—two feet ten inches apart, with longitudinal webs at intervals of six feet running the whole length of the vessel; and these subdivided by transverse

the "Persia," and at a greater degree of speed. But this was by no means all the saving, for by this decrease in consumption the number of coal-heavers and firemen employed had been materially reduced. These savings have been largely due to improved machinery, and the progress in the construction of hulls had not advanced in anything approaching a similar proportion.

plates into water-tight spaces of about six feet square, so that should the outer skin be damaged the water could only get in between the webs and inner skin. The ship is divided by transverse bulkheads into twelve water-tight compartments below the lower deck, and nine above the lower deck, so that should both the outer and inner skin be fractured the water could only enter one of these compartments,—two of which could be filled without danger to the safety of the vessel. Besides these transverse bulkheads there are two which extend from the bottom of the ship to the upper deck, and run longitudinally for a length of three hundred and fifty feet. There are also two tubular iron platforms extending from the gunwale to the longitudinal bulkheads, running fore and aft, thirty-six feet apart, and connected together about every sixty feet by iron platforms seven feet wide. The greatest care was taken to make the bow strong enough to resist any impediment, and to enable the vessel to resist the constant vibration of the screw.

The vessel has no keel, the bottom being flat. A keel-plate was first laid along a level platform prepared for it about five feet from the ground; then the centre-web, which somewhat resembles the keel of an ordinary ship.

The iron plates of which the skins of the vessel are composed are three-quarters of an inch thick, except the keel-plate, which is one inch thick. Their average size is about ten feet by two feet nine inches, and their weight eight hundred and twenty-five pounds. For the stern-post and keel some enormous plates were required. Two were twenty-seven feet long, three feet three inches wide, one and one-quarter inches thick, and weighed two tons each; others were twenty-five feet long, four feet wide, and one and one-quarter inches thick, and weighed two and one-quarter tons each. About thirty thousand plates, of an average weight of six hundred pounds each, were used in the construction of the hull. Each plate, before being placed in its proper position, was a separate study to the engineer. For each a model in wood was made, and by steam-shears the plates were cut according to the pattern; the proper curve was given to it, and the holes for the rivets were punched by machinery. They were riveted together by rivets, fastened at a white heat, some seven-eighths of an inch and some three-quarters of an inch in diameter, about two and a half inches apart where the plates were to be made water-tight, and from four to six inches apart in other places. The total number of rivets was not far from two million. About eight thousand tons of iron were used in her hull.

The estimated weight of the whole vessel when voyaging with every article and person on board was twenty-five thousand tons.

For the purpose of launching the vessel two ways were constructed, with pile foundations, one at the fore part of the vessel and one at the after part, each three hundred feet long and one hundred and twenty feet wide, with about one hundred and twenty feet of space between

them. The cradles, two in number, were of the same width as the ways. Their bottom was composed of iron plates seven inches wide and one inch thick, placed at intervals of one foot apart, with their edges carefully rounded off so as to offer the least resistance to the railway metals of the ways down which they would pass.

The first attempt to launch the vessel was made November 3, 1857, and the vessel was moved six feet down in her ways. Several other unsuccessful attempts were made on different days, until at length, January 31, 1858, she was afloat. The cost of building and launching the vessel in round numbers was seven hundred and thirty thousand pounds, exceeding the original estimate by two hundred and thirty thousand pounds. In November, 1858, the Eastern Steam Navigation Company, finding it impossible to go on, was dissolved, and a new corporation, called "The Great Ship Company," was formed, with a capital of three hundred and thirty thousand pounds. Of this capital, one hundred and sixty thousand pounds was to be paid to shareholders of the former corporation, the fitting and finishing would cost about one hundred and twenty thousand pounds, so that it was estimated fifty thousand pounds would be left for working expenses.

SUMMARY OF STATISTICS OF THE "GREAT EASTERN."

Length of upper deck	692 feet.
Length between perpendiculars	680 "
Breadth across paddle-boxes	118 "
Breadth of hull	83 "
Depth from deck to keel	58 "
Number of decks	4
Number of masts	6
Diameter of masts	2 feet 9 inches to 3 " 6 "
Quantity of canvas under full sail	6,500 square yards.
Number of anchors	10
Number of boats	20
Tonnage (old measurement)	22,500 tons.
Storage for cargo	6,000 "
Capacity of coal-bunkers	12,000 "
Draught of water, unladen	15 feet 6 inches.
Draught of water, laden	30 feet.
Number of water-tight compartments	12

Paddle-Wheels.

Diameter of paddle-wheels	56 feet.
Weight of "	185 tons.
Length of floats	13 feet.
Width of "	3 "
Number of floats to each wheel	30
Length of paddle-shafts	38 feet.
Weight of "	30 tons.
Length of intermediate cranked shaft	21½ feet.
Weight of " " "	31 tons.

Paddle-Engines.

Nominal horse-power	1,000
Number of cylinders	4
Diameter of "	6 feet 2 inches.
Weight of cylinders, including piston and rod	38 tons.
Length of stroke	14 feet.
Strokes per minute	14

Paddle-Engine Boilers.

Number of boilers	4
Furnaces to each	10
Length of boilers	17 feet 6 inches.
Width of "	17 " 9 "
Height of "	13 " 9 "
Weight of each	50 tons.
Weight of water	40 "
Area of heating surface	4,800 square feet.
Number of tubes	400
Thickness of plates	$\frac{3}{4}$ and $\frac{7}{16}$ inches.

Screw-Propeller.

Diameter of screw	24 feet.
Pitch of screw	37 "
Number of fans	4
Weight of screw	36 tons.
Length of propeller-shaft	160 feet.

Screw-Engines.

Nominal horse-power	1,600
Number of cylinders	4
Diameter of each cylinder	84 inches.
Length of stroke	4 feet.
Number of revolutions per minute	50

Screw-Boilers.

Number of boilers	6
Funnels to each boiler	12
Length of boiler	18 feet 6 inches.
Width of "	17 " 6 "
Height of "	14 feet.
Weight of "	57 tons.
Weight of water	45 "
Area of heating surface	5,000 square feet.
Number of tubes	420
Thickness of plates	$\frac{7}{16}$ and $\frac{1}{2}$ inches.
Number of auxiliary engines	4
Number of donkey-engines	10
Total horse-power, about	12,000

Passenger Accommodation.

Number of passengers (first-class)	800
" " (second-class)	2,000
" " (third-class)	1,200
Aggregate length of saloons and berths	350 feet.

Number of saloons	10
Length of principal saloon	100 feet.
Width	36 "
Height	13 "
Length of berths	14 "
Width of "	7 to 8 feet.
Height of "	7 feet 4 inches.

Nothing can stand comparison with Mr. Scott Russell's great steamship except Noah's ark; even Noah's ark could not match it. The length of the ark was three hundred cubits, its breadth fifty cubits, and its height thirty cubits. The Scripture "cubit," as stated by Sir Isaac Newton, is twenty inches and about sixty-two hundredths. Bishop Wilkins makes it somewhat more,—namely, twenty-one inches and about sixty-eight hundredths. Reducing these to English feet, and calculating the tonnage after the old law, we have approximately the following table:

	Noah's Ark according to Sir Isaac Newton.	Noah's Ark according to Bishop Wilkins.	Great Eastern.
Length between perpendiculars	515.62	547.00	680.00
Breadth	85.94	91.16	83.00
Depth	51.56	54.70	58.00
Keel or length for tonnage	464.08	492.31	630.02
Tonnage according to old law	18,232	21,762	28,093

So Noah's ark is quite overshadowed. Magnitude is not, however, the only peculiarity which the "Great Eastern" possessed. No other vessel afloat had two sets of engines and two propellers, nor was the cellular construction to be found elsewhere in marine architecture.

To comprehend the immense size of the ship one must go on the main deck. From that stand-point every foot of the deck is seen except the very shadow of the masts and chimneys. The wave of the hand can be seen by the steersman or any officer on watch on any part of the deck. Go on to the bridge between the paddle-boxes and look towards the bow, and you see a space and extent equal to the entire length of a very large steamer,—near two hundred and fifty feet,—and then turn your eye towards the stern and you have double the distance in that direction, the entire length of the deck being a little short of seven hundred feet, and the width eighty-four feet. This expanse of deck covers about an acre of surface, or one hundred and sixty square rods, stretched out into a long oval one-eighth of a mile, or forty rods in length. The deck of the ship is double, or cellular, after the plan of the Britannia tubular bridge, and is formed of two half-inch plates at the bottom and two half-inch plates at the top, between which are webs which run the whole length of the ship.

This deck is planned to be of such strength that were it taken up by its two extremities and the entire weight the vessel is to carry were hung upon its middle, it would sustain the whole unaided.

The deck is six hundred and ninety-two feet in length, or more than as long again as that of the steamship "Great Britain." It is nearly three times as long as that of the British line-of-battle ship the "Duke of Wellington"; eighty-eight feet more would make it as long again as the "Persia," the longest vessel, previous to the launch of the "Great Eastern," afloat upon the ocean.

"This ship," says a writer just after the launch, "is one of the wonders of this fast age, but whether, like some of the monstrosities of past ages, she is to be a mere curiosity and a monument of the folly of her builders, or whether she is to introduce a new age of progress in steam navigation, yet remains to be demonstrated. The first step in the solution of the problem is her safe and rapid passage from England to America."

"Granting, then," said the *Liverpool Albion*, just previous to her launch, "that the mammoth ship is merely an extended copy of all other iron steamers built on the wave-line principle, let us see what are the 'one or two exceptions' so modestly alluded to by Mr. Russell last week before the British Association of Dublin. The most prominent in reality, though the feature which escapes unprofessional visitors, is the cellular construction of the upper deck and the lower part of the hull, up to the water-line, or about thirty feet from the bottom, which is as flat as the floor of the room. This system, while it gives greater buoyancy to the hull, increases her strength enormously, and thus enables her to resist almost any outward pressure. Two walls of iron, about sixty feet high, divide her longitudinally into three parts,—the inner containing the boilers, the engine-rooms and the saloons, rising one above the other, and the lateral divisions the coal-bunkers; and above them the side cabins and berths. The saloons are nearly sixty feet in length, the principal one nearly half the width of the vessel, and lighted by skylights from the upper deck. On either side are the cabins and berths, those of the first-class being commodious rooms large enough to contain every requirement of the most fastidious landsmen. The thickness of the lower deck will prevent any sound from the engine-rooms reaching the passengers, and the vibrations from being at all felt by them. Each side of the engine-rooms is a tunnel through which the steam- and water-pipes will be carried, and also rails for economizing labor in conveyance of coal. The berths of the crew are forward, below the forecastle, which it is intended to appropriate to the officers.

"Below the berths of the seamen are two enormous cavities for cargo, of which five thousand tons can be carried, besides coals enough for the voyage to Australia, making about as many tons more.

"The weight of this huge ship being twelve thousand tons, and coal and cargo about eighteen thousand tons more, the motive-power to propel her twenty miles an hour must be proportionate. If the visitor

walks aft and looks down a deep chasm near the stern, he will perceive an enormous metal shaft one hundred and sixty feet in length and weighing sixty tons; this extends from the engine-room nearest the stern to the extremity of the ship, and is destined to move the screw, the four fans of which are of proportionate weight and dimensions. If next he walks forward and looks over the side, he will see a paddle-wheel considerably larger than the circle at Astley's; and when he learns that this wheel and its fellow will be driven by four engines, having a nominal power of one thousand horses, and the screw by a nominal power of sixteen hundred horses, he will have no difficulty in conceiving a voyage to America in seven, and Australia in thirty-five, days.

"The screw-engines, designed and manufactured by Messrs. J. Watt & Co., are the largest ever constructed, and when making fifty revolutions per minute will exert an effective force of not less than eight thousand horses. It is difficult to realize the work which this gigantic force would perform if applied to the ordinary operations of commerce: it would raise one hundred and thirty-two thousand gallons of water to the top of the Monument in one minute, or drive the machinery of forty of the largest cotton-mills in Manchester, giving employment to from thirty to forty thousand operatives.

"There are four cylinders, each about twenty-five tons, and eighty-four inches in diameter. The crank-shaft, to which the connecting-rods are applied, weighs about thirty tons. The boilers are six in number, having seventy-two furnaces, and an absorbent heating surface nearly equal in extent to an acre of ground. The total weight exceeds twelve hundred tons, yet so contrived that they can be set in motion or stopped by a single hand.

"Sails will not be much needed, for in careering over the Atlantic at twenty miles per hour, with a moderate wind, they would rather impede than aid; but in the event of a strong wind arising, going twenty-five miles per hour in the course of the vessel, sails may be used with advantage. The 'Great Eastern' is provided, accordingly, with seven masts, two square-rigged, the others carrying fore and aft sails only. The larger masts are iron tubes, the smaller of wood. The funnels, of which there will be five alternating with the masts, are constructed with double castings, and the space between the outer and inner casting will be filled with water, which will answer the double purpose of preventing the radiation of heat to the decks and economizing coal by causing the water to enter the boiler in a warm state. Her rigging will probably cause most disturbance of ideas to nautical observers, for, besides the unusual number of masts, she will want two most striking features of all other vessels, namely, bowsprit and figure-head. Another peculiarity is the absence of a poop. The captain's apartment is placed amidships, immediately below the bridge, whence the electric telegraph

will flash the commander's orders to the engineer below, helmsman at the wheel, and lookout man at the bows. In iron vessels, great precaution being necessary to prevent the compass from being influenced by the mass of metal in such attractive proximity, various experiments have been made with the view of discovering the best mode of overcoming this. It was originally intended to locate the compass upon a stage forty feet high, but this plan has been abandoned, and a standard compass will be affixed to the mizzen-mast at an elevation beyond the magnetic influence of the ship.

"Whatever misgivings may be felt as to the length and the weight she will carry amidships will be set at rest before she even touches the water by the mode of launching, an operation as great a novelty as the ship herself. The plan hitherto has been to build the vessel on an inclined plane, and at right angles with the water; but in case of the 'Great Eastern' this was impossible, on account of her great length, to say nothing of the expense of building a vessel of her enormous dimensions in a position which would elevate her forecastle nearly a hundred feet above the ground. These considerations led Mr. Brunel to determine upon launching her sideways, with which view she has been built parallel with the river. In constructing the foundation of the floor upon which it stands provision has been made at two points to insure sufficient strength to bear the whole weight when completed. On these two points she will rest when ready, and thus her strength will be tested in the severest and therefore most satisfactory manner. Two cradles will be introduced at these points, and she will then be moved by two hydraulic engines. Timber ways are laid down to low-water mark, with an incline of one foot in twelve, and iron rails of peculiar construction are to be laid upon these transversely. A tell-tale will indicate the rate at which the two ends are descending, and any difference that may occur will be immediately rectified by strong check-tackles. It is calculated that she will advance twelve feet per minute, at which speed her submersion will be effected in twenty minutes. The cradles will then be drawn from under her, and she will be towed over to the opposite side of the river, where she will lie until ready for sea."

The London *Times*, after describing the big ship, thus discourses concerning her:

"With these principal figures, then, gone through, let us imagine the 'Great Eastern' afloat and on her road to Bombay or Melbourne, and with her ordinary complement of passengers on board. The first idea that strikes us is the multitude of faces on board. It will, in fact, be a whole town afloat, and much more than a town of four thousand population, because it will be a floating town of four thousand grown-up persons, at least with comparatively few exceptions, each of them being what is called an 'individual,'—by which we mean a human being of size to command notice, and having, to appearance at least, a mind and

will of his own, together with a formed air, tone, and manner peculiar to himself. In this sense even young ladies are individuals. All this crowd of individuals will be collected within the dimensions of seven hundred feet by sixty. What a new shape of human society! Take the eight hundred first-class passengers by themselves, and what room does even this number afford for the formation of all kinds of different circles and sets, which will know nothing of each other, one man only knowing another by sight, and hardly that! How many immeasurable social charms will be collected within a few hundred feet! How many Mr. Smiths will there be who will not speak to Mr. Jones during the whole voyage because he is not in the same set! How many Mr. Joneses will pay back Mr. Smith in the same coin! Between how many 'nice' young ladies and 'proper' young gentlemen will there not be a great gulf fixed, because in the eyes of anxious mothers the said young gentlemen are not desirable persons, but mere penniless bipeds! What flirtations will there not be behind boats, what rivalries, and, if many Americans voyage by the 'Great Eastern,' what duelings may we not expect on that ample deck! In short, what an epitome or camera obscura of the world will the 'Great Eastern' present! It will be worth any aspiring novelist's while to take his berth to Australia or India and back again, simply for the great convenience of having so much human nature brought before him within so small a compass. It will be the mountain brought to Mahomet, the world condensing itself before his eyes for the sake of being observed and examined; the rapid succession of faces will bewilder him at first, but individuality will come out in time, though he must be sharp about his work, otherwise the 'Great Eastern' will have stopped her screw and paddles before he has got any results. If his material is enlarged his time is much curtailed on the new system. Farewell to long voyages with their appropriate quarrels and matches, their love-makings, reconciliations, and irrevocable unions; voyage-life has entered on another phase. For what is a month? It is gone before we begin to think about its going. How will the old voyagers look back to the romantic days when a roomful of persons were their own company for four months, gradually forming enmities or friendships, when attachments rose up among 'young people' unconsciously, and by the mere passive influence of the scene! We are growing a busier nation every year, and cannot afford time for more than one chapter of this sea romance."

After hopes deferred, and delays almost innumerable, the mammoth steamship "Great Eastern" made a highly successful trip across the Atlantic, and moored at the dock prepared for it in New York.

The event marks an era in the history of steam navigation. That a vessel so monstrous in its proportions—by the side of which the first steamer of Fulton would be but a cock-boat—should have been propelled across the ocean by the power of steam alone, shows what strides

have been made since 1818, when the little American steamer "Savannah" ventured to cross the Atlantic, steaming when the wind was not fair, and sailing with favoring gales.

The "Great Eastern" differs from all ships which have been built before it in three respects, the chief of which is its excessive magnitude. Nothing like it ever before floated. We have given the figures of her huge dimensions, but these naked numerals convey but a vague idea.

The immense steamships in the English and American navy hardly equal half her length or breadth, and yet such vessels as the "Himalaya," the "Persia," the "Adriatic," and the "Niagara" were previously regarded as absolute prodigies in marine architecture.

The "Great Eastern" had thirty-eight passengers and eight guests on her first voyage to the United States. Their names are as follows: Miss Herburt, Mr. and Mrs. Gooch, Mr. and Mrs. Stainthorp, General Watkins, Lieutenant-Colonel Harrison, Captain Morris, R.N., Captain McKennan, R.N., Major Balfour, Captain Drummond, Captain Carnagee,[60] R.N., Rev. Mr. Southey, Mr. A. Woods, correspondent London *Times*, Mr. J. S. Oakford, London, agent Vanderbilt Line, Mr. Murphy, New York pilot, Mr. Russell, Zerah Colburn, Mr. Holly, correspondent New York *Times*, H. M. Wells, Mr. McKenzie, G. S. Roebuck, Mr. Skinner, D. Kinnedy, G. E. M. Taylor, G. D. Brooks, Mr. Taylor, T. Harnley, H. Marin, Mr. Cave, A. Zuravelloff, Mr. Merrifield, Mr. Field, Mr. Barber, R. Marson, G. Hawkins, H. Cangtan, W. T. Stimpson, Mr. Beresford, Mr. Hubbard, George Wilkes.

OFFICIAL RUN OF THE "GREAT EASTERN."

June 18,	lat. 49° 27′,	lon.	8° 45′;	run since yesterday,		285	miles.
" 19,	" 48° 41′,	"	16° 12′	"	"	296	"
" 20,	" 47° 40′,	"	27° 54′	"	"	276	"
" 21,	" 46° 16′,	"	30° 03′	"	"	304	"
" 22,	" 44° 50′,	"	56° 22′	"	"	280	"
" 23,	" 42° 50′,	"	42° 40′	"	"	302	"
" 24,	" 41° 01′,	"	48° 52′	"	"	299	"
" 25,	" 40° 58′,	"	56° 10′	"	"	325	"
" 26,	" 40° 58′,	"	63° 41′	"	"	333	"
" 27,	" 40° 13′,	"	68° 56′	"	"	254	"
" 28,	" 40° 28′,	"	74° 00′	"	"	234	"
Total						3188	"

The New York *Herald* gave a lengthy account of the trip, from which we extract a few passages:

"THE START.—The 'Great Eastern' was advertised to sail on Saturday, the 16th of June. Workmen were engaged on her up to five o'clock in the afternoon of that day, and before they could be disem-

[60] Captain Carnagee and Mr. Gooch are directors in the Great Ship Company, and Mr. Russell is a son of J. Scott Russell, architect of the ship.

barked, the weather, which had been stormy since noon, became thick and hazy, so that it was felt by the pilot that it would be dangerous to attempt taking so large a vessel through the intricate channel of the Solent in the uncertain light of the evening. She lay, therefore, at her moorings, in Southampton water, till Sunday morning. About seven o'clock orders were given to unshackle the mooring-chains. Such is the ponderous character of these cables, that it was some forty-five minutes before this could be effected.

"The morning was raw and gusty, with the wind blowing down the water. The tide had canted the high vessel athwart the channel, which she appeared to half block up, but on hoisting the fore-staysail she slowly paid off and got her head pointed in the direction she was to go. Steam was admitted into the cylinders of the paddle-engines about ten minutes past eight; shortly after the order was given, 'Easy ahead with the screw,' and the 'Great Eastern' steamed slowly out on her first voyage to sea. It has been a matter of remark in all the trials, that no motion whatever is felt when the ship is under way. It was not until the objects on shore began to recede that one could realize the fact of the huge ship being fairly on her journey. A few minutes' steaming brought us abreast of Calshot Castle, where the colors were dipped in acknowledgment of a similar courtesy from the fort. With this exception our departure was ungreeted. The men on board the few vessels we saw had seen so much of the big ship that she excited no emotion in their minds, and we passed without a single cheer. The ship rounded the bell-buoy and ran into the Solent with the handiness of a yacht. As we passed Yarmouth our presence was acknowledged by lowering the ensign of the Yacht Club-House, a civility duly returned by the ship. In two hours from starting we were abreast of the Needles. At twenty minutes past ten o'clock we discharged our Southampton pilot, Mr. Bowyer. In a few minutes we again got under way, with the screw making twenty-seven and the paddles about seven and a half revolutions per minute, and ran down channel. The ship on starting drew twenty-two feet of water forward and twenty-six aft. Her right trim is on an even keel, so that her condition was rather unfavorable to her best performance. She had five thousand five hundred tons of coal in the bunkers. Being stored principally aft, this had something to do with her being down by the stern. The object of the trip was not to attempt to get any great amount of speed out of the ship, but to get the machinery and men in good working order.

"The 'Great Eastern' so outrages all generally-received notions of ship- and of sea-life, that when in strolling about one of her spacious unoccupied lower decks a party of English and American gentlemen are discovered in an odd corner engaged in a great international skittle-match, one accepts it as a matter of course, and is thereupon fully prepared to find a billiard-table in full blast in some other unexplored

compartment of the vessel. It is certainly the first time skittles were ever played in crossing the Atlantic, but the idea is a good one, as enabling those who are fond of athletic sports to divert the tedium of a sea-passage by first-rate physical exercise. Several exciting foot-races have come off round our ample deck, and the distance to be run in making the complete circuit has been found quite sufficient to give the competitors a very decided 'breathing.'

"For those whose tastes do not lie in the direction of gymnastics there is a well-selected library of the English classics, which the accommodations of the saloons enable one to enjoy most luxuriously. Quite an interesting feature in our trip has been evening concerts in the ladies' saloons. Mr. Macfarlane, the conductor, and an able pianist of the ship's band have added much to the general enjoyment by the excellent manner in which they have rendered a popular selection of music arranged as duets for the piano-forte and the cornet-a-piston. Vocal amateurs among the officers and passengers have varied the performance by their efforts, and Captain Hall has shown that to his other accomplishments must be added that of being an excellent musician, his proficiency on the flute being very seldom equaled by amateurs.

"Thursday, June 28.—Ran under easy steam all night, and at twenty-five minutes past seven o'clock (ship's time) this morning reached the light-ship at Sandy Hook, thus making the run, in spite of the long route taken, the loss of time by encountering the Gulf Stream, and the delay from fogs, in eleven days two hours, including the difference of time. The distance run by the ship was three thousand two hundred and forty-two miles; deducting the loss of time by the fog, this gives a speed of about thirteen knots, proving that with a clear bottom and full pressure of steam she would overrun Brunel's estimate of fourteen and a half knots an hour for a long run.

"Though the passage was, all things considered, decidedly fine, it was still sufficiently checkered to settle the important point of the 'Great Eastern' being the most comfortable passenger-ship in the world. Her movements in a sea-way are so long, slight, and easy that no inconvenience is produced. Sea-sickness may be considered as annihilated, and all the attendant discomfort of a sea-passage reduced to a minimum."

Mr. George Wilkes, editor of *Wilkes' Spirit of the Times*, a passenger on the "Great Eastern," has furnished a graphic account of his trip. The getting on board and the first day of the voyage he makes of but little account, but after a night on board he writes as follows:

"Monday, June 18.—I was awoke this morning by the sun shining brightly through my port-hole (I should rather use the plural, for my sumptuous apartment was lit by two), and I rose to enjoy the luxury of dressing in a carpeted space as large almost as a room in the St. Nicholas. Before I got up, however, I lay for a few minutes to observe the silence and quiet of the vessel. In fact, there seemed to

be no motion to her at all, and had it not been for the barely perceptible buzz of her bow—to which I was very near—as it split the water and passed it humming along the vessel's beautiful wave-line, I should have not been able to decide with certainty whether she was going on or standing still. Vibration there was none, and as for the usual clatter of machinery, which is the distinguishing feature of a steamship, it could not be heard at all. Moreover, there was not any of the squeaking and squealing of timbers and tortured wood-work, which makes up a hideous serenade on all other vessels, for our party-walls, our state-room floors and ceilings, are of iron, and so ribbed and morticed, and joined stiffly with the hull, that the ship, while passing through still water, seems to be one solid tube or beam. Indeed, I could not make it certain to my senses that she had not stopped, until, looking out of my port-hole, I saw the ocean passing by, and our vast mass moving gradually through it like a floating castle. When I went on deck I found the air cool and bracing, but all there was of wind was caused by our own motion. At eight o'clock her paddle-engines gave ten revolutions, and those for the propeller twenty-nine, while the log, which was heaved a few minutes afterwards, credited her with a rate of ten knots. After timing the stroke of the engines I took a look at the rapidly-revolving paddles, and found that their original diameter of fifty-six feet, which had proved to be too large, had been reduced to fifty feet by reefing or drawing in the floats, or paddles, three feet on each arm. A large projection of useless iron consequently extends beyond the actual wheels to make an unnecessary resistance to the water, and I am told that the wheel would do better still if the floats were reefed in yet farther.

"I now took my first promenade around the deck, and though well instructed in its vast proportions, I could not help wondering, as I went on, to see the space unroll before me as it did. Standing at the stern and looking forward, the vessel seems almost to terminate amidships, but when you reach that point there appears to open up another ship before you. This illusion proceeds from the fact that two large life-boats, which had hung outside towards the bow, had been brought in at the request of the Board of Trade, and set on blocks in the centre of the ship to divide the view. These, however, will be removed as soon as the vessel gets into port, and then there will be restored a clean, unobstructed double avenue, through which our friend Hiram Woodruff might drive a double team, and go only four times round to make a mile. The deck is flush from stem to stern, and its only obstructions are the six masts, the five smoke-funnels in between, the raised sky-lights for cabin ventilation, and seven low structures, all of which run in a line with the masts and smoke-stacks. The two outermost of these—stem and stern—are sheds for the donkey or auxiliary engines; two are erections for the main cabin entrances; one spacious one in the centre of the quarter-deck is allotted to the captain; another of like character is the double residence of the first and second officers, and another still, of tolerable size, is given to the passengers as a smoking-room. These are the only obstructions which are found on deck, while around them runs a clean twelve-foot promenade, one side of which has been named Broadway and the other Fifth Avenue. The floor of the deck, like the hull of the ship, is of iron, and built like the sides, on the tubular principle, with twenty-one inches of space between its walls, and interlaced and strapped, crossed and recrossed, with welded bars, so as to give it not only the buoyancy of a life-preserver, but almost incalculable strength. The facing of this floor is pine. Two men are usually placed at each of the wheels, so that eight are enabled to steer her; and four auxiliary wheels can be added, by which a force of thirty-two men can be brought to bear. Only four, however, are now guiding her through the calm, mild weather of the morning. The course is given by the first officer, the man next the compass guides the motions of the rest; and if the direction of the ship requires a sudden change, an auxiliary compass, or indicator, which receives its impulse from the central bridge, directs them immediately what to do. But for this device it would be difficult to guide the ship without great loss of time; but now orders are communicated from end to end with

the speed of light, and the leviathan answers to her rudder and points its nose as readily as if drawn with a hook, 'or led' by its tongue with a cord.

"At noon, as the bugle summoned us to lunch, I timed the paddle-piston at ten revolutions and the propeller at thirty and a half, and the log at the same time reported twelve and a half knots. The run of the ship for the last twenty-six hours was reported as three hundred miles. Latitude 49° 27′, longitude 8° 45′. When we came up from lunch we found that a light breeze had set in upon our larboard quarter, and our jib and forward trysails were spread to take advantage of it. The wind freshened as the afternoon grew on, and at three o'clock the billows began to crispen at their tops and indicate a rising sea. At four o'clock a drizzling rain set in, and the still strengthening wind gave promise of a stormy night. Some of us had been apprehensive, from the mild manner in which we had set out, that the voyage might run through the entire length of its term in the same dull way, and thus, while it deprived us of the least possibility of becoming heroes, land us at New York without any further knowledge of the ship and her sea-going qualities than we could have learned by studying her while anchored in the Thames. The fear of such disappointment, however, was dispelled by the time we had wiped our beards from dinner, for on ascending to the deck at six o'clock and taking our position on the elevated grating in her bow, we saw the leviathan, before so dead, so apparently inert, and which had been passing through the waters like some spectral island, quicken with life and bend with a slow grandeur to the motion of the sea. 'Thank God, she rolls!' exclaimed an experienced officer on her first trial trip, when she was caught in a series of heavy billows off Portland Race, and it was with something like the same ebullition of delight that we saw the mighty ship cast her silent disposition off and make her obeisance to the still mightier deep. Her motion was a gentle and majestic swing from side to side, the extent of three or four degrees, and now and then when a billow fell away from her bow and a swell at the same time would roll underneath her stern, she would mildly yield her head,—not short and sudden, with a plebeian start, but with a monarch's measured grace, as if she felt herself to be the master, and only yielding to the courteous laws of life. It was a great treat to see her thus leaning her way from side to side through the parting waters, while good-sized ships, which were then in sight, were rolling uneasily or pitching from stem to stern. It was like some accomplished swimmer, who sweeps forward gracefully hand over hand, compared to a clumsy novice who barely manages to keep himself afloat through the rapidity of a short digging motion. The 'Great Eastern' was alive; but mighty as she was, still she was amenable to that vast throb and pulsation of the sea which is mightier than the mightiest. Nevertheless she proved, by the comparison before us, her superiority to all ordinary ships, as well as to any disturbing motion. In fact, her soft undulations gave actual relief and pleasure to every one who stood upon her deck. And all the while this motion was upon her the skittles were played at one of the after-holds. Nevertheless, let it be noted here that the theory that ships above a certain size will march through the wave superior to the perturbation of the sea is ended by our experiment forever. No ship can be made large enough to entirely ignore the gigantic pulsation of the ocean. The foresail and fore-topsail were drawing well at dark, and the wind, which now struck us almost astern, was whistling through our cordage with great noise.

"A Gale.—Tuesday, January 19, I was awakened a little after midnight by the howling of the wind, the shouts of the men taking in sail, and a great tramping overhead. The vessel was rolling more than she had at any time before,—say about eight or nine degrees,—and I could now feel a little vibration of her bow, imparted by the screw as it smote and scudded into the water whenever the motion of the vessel lifted its blades above the surface. I went to my window, but the night was too thick for anything but darkness to be seen, and all I could distinctly hear was the measured wail of one hundred and twenty men (for both watches had been called up) in chorus, to 'haul the bowline, haul,' while engaged in trying to take in the mainsail

and main-topsail. The wind seemed to soften a little at two o'clock, but perhaps that was the notion of my drowsiness, for I fell asleep at that hour, while the men were still as busily engaged at the mainsail as ever. I afterwards learned that it had employed them five hours to furl it in the furious tempest that prevailed. The cause of this difficulty was partly owing to the violence of the gale acting upon the immense area of the sail, and partly to the unhandy size of the tackle by which it must necessarily be worked. Everything is exaggerated in the way of size on board the 'Great Eastern,' and to be handled aloft as other ships she requires an extra breed of men. The gale subsided a little in its fury at four o'clock, but when I arose, at seven, I still found it blowing very hard, and the sea covered with a thread-like foam, which filled the hollows as well as whitened on the billow tops. Still the ship rolled only eight degrees, and her stately nod did not disturb a plate upon the table. The storm-rack was laid at breakfast to protect the dishes, but it was not needed, for my full tea-cup sat outside of it without being in the slightest peril of a slip. Nevertheless, a three-thousand-ton vessel would have been pitching sadly. The motion did not succeed in making a single person sea-sick, though there were among her passengers several who had never been to sea before.

"The wind moderated still more during the afternoon, and we set all our top-sails, but the ship kept up her motion, and went frolicking along her path as full of life as a clipper-brig or a pilot-boat. Nothing could be more beautiful than to stand upon the elevated grating in her bow and see her stern lift itself majestically against the sky as we dropped into some yielding wave before us, or to behold her rising sideways to her equilibrium, like some frolicking beauty lifting her shoulder in her downy bed. I could hardly realize, as I viewed her buoyant step upon the deep, that ten thousand plates of iron, representing twelve thousand tons of inert metal, clamped by three million rivets, and bearing within, besides her ponderous engines, six thousand tons of coal, could career thus, cork-like, upon the bosom of the thin and shifting element below. Yet there she rode, ship-like and sweet, 'a thing of beauty and of joy forever.' The most striking idea of her size, however, and the greatest demand upon your wonder that she swims so lightly, is obtained by going down by her sponsons, outside and aft the paddle-boxes, which enables you to see the entire of her towering section abaft the wheel. From that point you face up and down her massive sides and see the black warehouse, for it looks not like a ship, grandly rise and fall in the hissing and downy foam which the wheels send flying by her run. This flying foam unites beneath her stern, and is there strewn into lace-work by the propeller, and goes seething on its broad path for miles. I think the scene from this lower platform of the gangway gives the finest idea, while in motion, of the vast power and grandeur of the ship. The deck and rigging, on the other hand, being seen all together, lose in a little while their command upon the wonder, for their great symmetry so wins upon the eye that they mingle together in apparently usual degrees. It is only when in comparison with some other object that the 'Great Eastern' sensibly exhibits her huge proportions to an accustomed eye, and then everything else is dwarfed by her neighborhood.

"Wednesday, June 27.—Fine weather, with a breeze which kept four of our try-sails set, continued the afternoon, but at six o'clock a very heavy fog set in, which condensed itself upon the rigging in huge drops that fell upon the deck like rain. So dense did this all-pervading mist become that the lookouts could scarcely see ten feet from the ship, and our lights could not have been distinguished at the distance of a hundred yards ahead; so out of mercy to the unwary who might possibly be in our path, at near reach to shore, we slackened our speed down from fifteen to seven and a half knots, and ran at this rate, with frequent warnings from our whistle, all night. Under this state of affairs it was thought prudent, moreover, that we should make soundings to ascertain with certainty exactly where we were, but the effort failed at every attempt, in consequence of the great height we were above the water, requiring more line than we could pay out while the vessel was in motion. We slowed her down to six knots, then to four, and then to two, but still it would

not answer, and the order went from the captain that the ship must be absolutely stopped.

"It had been the particular pride of Mr. McLenan, the chief engineer, who is a perfect enthusiast in his duty, that the ship's engines, which had been so much abused and misrepresented for the last year, should perform what scarcely, if ever, had been done before: and that was to make a first Atlantic voyage without a single moment's pause from port to port. When, therefore, he heard the order to stop the ship he received it like a man who was smitten with a sentence, and asked with the greatest earnestness if we could not get along without. The answer was against him, and the lungs of the monster were folded from their respirations, and after ten minutes' run with silent wheels and blades, and final reversal of her wheels, she sat still upon the waters. This event took place at 11.40, but a cast of one hundred and fifteen fathoms of line gave us no bottom, and we went on again, at twelve o'clock, still, however, continuing only at half speed. At ten minutes to five this morning we made another pause to heave the lead again, and this time with a cast of sixty-five fathoms we found bottom on George's Bank, and at ten minutes past five went on again. The fog having lifted, we now resumed our speed and proceeded at our usual rate of thirteen and fourteen knots. During these two pauses the engineer rapidly examined such of the screws and nuts as were not accessible during the action of the engines, but did not discover one that was out of place or that required tightening,—a great proof of the excellence and condition of her machinery.

"Thus ended the first transatlantic voyage of the 'Great Eastern,' and though it may be regarded as a failure in the way of speed, it will be perceived there were interests at stake which transcended that consideration, and which doubtless justified the commander in the unusual care he took to keep the great ship safe.

"Captain Vine Hall is one of the most experienced navigators of the English East India trade, but in addition to the caution which he naturally felt incumbent on him from the fact that he had never crossed the Atlantic before, he was doubtless deeply impressed with the paramount importance, not only to his employers and the cause of science, but to England and the whole world, of giving a substantial proof that ships of the size of the 'Great Eastern' could safely cross the deep. It was therefore properly a matter of secondary consequence to him whether the enthusiasm of his passengers or the ardor of his engineers or officers should chafe at his divergences or extra care; he accomplished the great point that was required, and we who left England with him but ten days before are here to approve his action. When he returns to England in September he will give the leviathan its head, and she will then prove for herself that speed is one of her attributes as well as safety. In fact, she has proven it already by the manner in which she has accomplished this voyage, and there is not a passenger who crossed in her but views her as beyond all comparison the most superior passenger-ship that ever floated. The extra distance which she ran on this trip is certainly equal to more than a day's travel, and when we add to this that twenty-four hours' margin is always allowed to a new ship's first voyage, and take into consideration also that not an officer on board ever made a voyage in her, that the men were all raw recruits, fresh levied within three days of starting, and that even the stokers did not know how to spread coal to advantage on the fires, we cannot help regarding even the *time* she made as a great triumph. As to her comfort and convenience as a passenger-ship, it is hardly possible to say too much in praise of her. She meets all the requirements of the most luxurious hotel, and when the weather drives her inhabitants below they can promenade through her cabins upon long walks, or lounge about upon superb divans, listening to music that would not discredit the most pretentious concert. By her continued steadiness sea-sickness is entirely ignored, and in the way of strength, no iron structure that ever has been made can at all compare with her.

"This was impressed upon us by every sway of the sea, and the idea which she continually enforces on the mind, above all others, is her absolute safety from all

ordinary dangers of the ocean. Against the risks resulting from contact with a solid body she is beyond all calculation stronger than anything which has been seen afloat. The manner in which her vast weight stood poised upon two single rests in the builder's yard for weeks before her launch, and the thundering against her sides of the huge battering-rams that smote her inch by inch towards the water, give evidence of what she can endure. No shoal or beach could break her before all her passengers could escape, for 'her scales are her pride, shut up together as with a close seal. They are joined one to another, they stick together that they cannot be sundered.'

"Above all other ships she should be chosen by the timid, and it really is a puzzle to me how so many intelligent men who had read the history of her construction, and who were about crossing to New York at the date of her departure, could be induced to choose any other vessel. She is certainly exempt from all the ordinary dangers of the sea, and any one who will go into her bow and look at the fourteen feet of matted iron in that welded beak, will credit her with sufficient power and impulse to split and push aside any ordinary iceberg."

ARRIVAL AT NEW YORK.—The "Great Eastern" arrived at the bar at about seven o'clock on Thursday morning, and it being known that she would be detained outside until high water (two o'clock), ample time was afforded to everybody who had the means to go down the bay to meet her, or to take eligible positions to witness her approach to the city. Messrs. Grinnell, Minturn & Co., the consignees of the ship, with their friends and the press, went down in a steamer and came up on board the "Great Eastern." Of the passage of the bar, and the trip up the bay, the New York *Times* gives the following sketch:

"About two o'clock the order was given to cast off the steamer's tugs, which lay like two long-boats under her quarters, and Mr. Murphy, the pilot, with Captain Hall, mounted the starboard wheel-house, and the word was passed, 'Head slow with the paddles.' In another moment the enormous wheels were in motion, and the ship began to move. Slowly her great prow was turned off shore and headed towards the light-ship, for the purpose of getting a good entrance to the ship-channel. At 2.30 P.M. both the paddles and screw were in rapid motion, the ship heading towards Sandy Hook. The speed of the ship was now increased, so that the half-dozen steamboats which followed in her wake could with difficulty keep up with her. At three o'clock the ship was on the bar, when the paddles were slowed, as is the custom in passing that point with all vessels of heavy draught. She went over, however, without any difficulty, and the long-dreaded bar was safely passed. Full steam was now given to both the screw- and paddle-engines, and she made excellent time in coming up with and passing the Hook. Here the telegraph station was decked out with a profusion of flags, and as 'they had no guns to fire,' the fog-bell was vigorously tolled, a greeting to the passing steamer. This was replied to by cheers from the passengers gathered on the port side, in which Captain Hall joined; the ensign was also dipped. Meantime an *extempore* lunch was prepared below for the newly-arrived guests, whom Captain Carnagee welcomed to the ship in a few words, to which Mr. Grinnell responded,

giving as a sentiment the Press of New York, which was acknowledged briefly by Mr. Raymond and Mr. Erastus Brooks.

"Steering well to the southward to give ample room in which to turn the only remaining point of difficulty,—the Southwest Spit,—the order was given to slow the paddles to half-speed; the helm was put hard a-port, and in less time than it takes to describe the operation she made the circuit of the spit with all the ease of a pilot-boat. No description could do justice to the scene of animation and enthusiasm which now surrounded the steamer as she approached the Narrows. Steamers of all sizes and descriptions swarmed about her, crowded with ladies and gentlemen cheering and waving their salutations.

"At a few minutes after 3 P.M. the 'Great Eastern' was dimly discerned in the foggy distance of the lower bay. Then she disappeared behind the bluff, and an hour passed before, over the walls of the new fort, at the distance of four miles, the tall masts of the great ship were seen rapidly passing. With an uncontrollable impulse a shout arose from the vast crowd on the old quarantine grounds and from Burr's Gardens. Opposite Fort Hamilton she stopped, and the fort gave her a rousing salute of cannon. When she resumed her 'onward march, her triumph o'er the deep,'—which at this point meant the bay of New York, that it was said she never could enter,—she in due courtesy replied in cannon. As she passed the various landings on the island she was also greeted with gunpowder, and her health and the good wishes of the spectators were drank, not in as much lager beer as would float her, but certainly in a great quantity of lager beer. As she passed the shore of the island she was admirable in her appearance. Though at the distance of more than a mile and a half, with the smoke of her cannon mantling about her and partially obscuring her magnificent proportions, she announced herself as the leviathan of the bay. By the rule of parallax, her size was indeed enormous, for she seemed to shut from observation miles of Long Island Heights over and below Greenwood and Gowanus. Her appearance as she passed up the bay took everybody by surprise. Not only was no voice of detraction heard, but all spectators were almost madly enthusiastic in her praise.

"The effort to round her to at the foot of Hammond Street was not successful, it being found necessary to moderate her speed so much that steerage-way was lost as soon as the engines were stopped. She accordingly swung with her head up-stream, and the efforts of two tugs, with hawsers at her bow, could not wind her. After drifting with the flood-tide, backing and going ahead for a long time, she was at length turned round, and at about eight o'clock P.M. she was snugly got into her berth and made fast.

"There was no lack of admiration for the vast proportions, the graceful lines, and the internal arrangements and ornamentation of the

ship. There was much surprise expressed at the neglected condition of the decks, which appeared as if they had neither been cleaned, scraped, holystoned, or varnished since she was launched. The planks in many places appeared badly shrunken, and suffering for want of wetting down. The same was observed of the platforms on both sides of the paddle-boxes, and other portions of wood-work of the ship. The smoke-pipes look as if they had encountered the storms of a voyage from India instead of England, and there is a general dirty appearance of the whole outside portion of the ship. It is understood that it will take several days to put her in condition to receive the visits of the public."[61]

1859.—In 1859 steam navigation was introduced upon the Amoor River, China, by private means. The first steam vessel, called the "Admiral Kozawitch," was launched upon the waters of that river in the summer of that year. She was built in the United States, brought over in pieces, and put together at Nicolajefsk. She was constructed of timber, and had one paddle-wheel, and that astern. On her first trip she went up the river to the confluence of the Shika, and returned to Nicolajefsk. She then went up the river as far as the thriving town of Michael Semenofshy, at the mouth of the Soongari, and finally to Nianchoorsky, near Algoon, where she remained for the winter.

[61] The Hon. John McLeod Murphy, once an officer of the United States navy, in a lecture on "American Ships and Ship-Builders," delivered at Clinton Hall, New York, December 29, 1859, took occasion to say,—

"I am not a prophet, nor the son of a prophet, but I hazard little in expressing the conviction that a monster ship, far exceeding the 'Great Eastern' in model and build, will yet be launched in this country; but her keel will not be laid until it is clearly demonstrated that she can be *made to pay*. Perhaps in the calm waters of the Pacific, when our trade shall have been fairly opened with Japan, the vessel that shall bring her enchanting fabrics and people will outstrip in magnitude and strength and speed the gigantic form of that which was conceived in the feverish brain of Brunel."

The Manchester (England) *Examiner* reported in 1880 that the "Great Eastern" would be sold by auction soon, unless previously disposed of by private treaty. The step proposed was foreshadowed in the last report of the directors of the company, as will be gathered from the following paragraph: "During the past year several proposals for the employment of the ship have been made, but have fallen through from some cause or other; the directors are, however, using their best exertions to attain that object, which now becomes imperative, as the funds available for the maintenance of the ship are approaching exhaustion, and under these circumstances the directors feel it desirable to take powers from the shareholders to dispose of the ship in case no favorable proposal for chartering her should be received." The balance to the debt of profit and loss account at the close of the last year was eight thousand four hundred and thirty-one pounds. Considerable expenditure was made on the vessel last year, when she had new upper decks and part new masts. It may be stated that the capital of the company is one hundred thousand pounds, and that she stood in the books at the close of 1880 at eighty-six thousand seven hundred and fifteen pounds. She has been employed in various ways, but, perhaps, in none more successfully than the laying of the Atlantic cable. She is stated now to be in excellent condition.

(To be continued.)

THE NECESSITY FOR A SYSTEM OF NATIONAL DEFENSE.

As the most rapidly developed and developing nation of the world, the question presents itself to us with greater force year by year, What are our means of national defense? And should we not have some more thorough system to this end than that bequeathed to us by our great-grandfathers, at a time when an enemy operating upon our shores found himself in a vast and almost unknown wilderness, three months from his base of supplies?

This problem is one from which there is no escape. Like Banquo's ghost, it will not down; we must look it fairly in the face, and if we solve it not promptly and truly, we shall without doubt pay the penalty of our supineness and procrastination in humiliation and defeat by an enemy whom we have learned to despise while looking in pride upon our gigantic strides in the arts of peace.

We have not, it is true, the imperative need of large armed forces which is experienced by the greater European powers, whose very existence may be said to depend upon their ability to maintain it with the sword; not to mention the constantly-recurring questions which make the peace of Europe a thing scarcely to be depended upon from month to month. We have, most fortunately, no stake in the so-called Eastern question, and in the other issues which are constantly arising across the Atlantic. But on this side of the world issues have arisen, and doubtless will arise in the future, in which we must define our position and be ready to maintain it by force of arms if need be.

A question of great importance, however, has been broached and is to be settled in the near future, peacefully if we can, forcibly if we must; namely, that involved in the Monroe Doctrine. It is to be hoped that no nation but our own will consider this issue of sufficient importance to them to warrant an appeal to arms in its interest; but by the assertion and maintenance of this doctrine we assume a position which may ultimately embroil us with nations towards whom we now entertain the most kindly feelings.

Our progress in the arts of peace and the consequent increase of our wealth have been unprecedented among nations; and we should not allow ourselves to forget that as we build up our national prosperity we

should at the same time prepare the means of defending it, as well as of asserting and maintaining those rights which the stronger nations are apt to disregard when not backed by a display of force.

Had we been looked upon as a people ready and able to right our own wrongs and defend our own interests, the war of 1812 would probably never have occurred; and it is by being at all times ready to maintain our rights and defend our interests that we are most likely to avoid the necessity for doing so.

It is, however, much to be feared that our people are inclined to rely too greatly for protection upon our vast resources, which, as the word implies, cannot be considered in themselves as the *immediate* sources of strength, but merely as the means of producing strength after proper time expended in directing them.

In the earlier part of this century our militia and volunteer forces were unable to prevent a hostile landing upon our shores, and the burning of our capital over two years after war had been declared. At that time the voyage across the Atlantic was an affair of as many months as it is now of weeks, added to which was the total uncertainty at what time during the three months following the departure of a squadron it would reach its destination, and the practical impossibility of the component parts reaching such destination at one and the same time.

The case is now, however, somewhat changed.

Let us look over our means of resistance to a powerful invasion. We have patriotic men in abundance of whom to create an army, and we have, or have the means of producing, arms and munitions of war in sufficient quantities. But possessing all these, we have not, and cannot have under a period of several months at the earliest, an army capable of coping upon equal terms with the trained and disciplined armies of the Old World.

The large and perfectly organized armies of the present age, and the consequently short duration of wars, preclude the possibility of raising and training an army when needed for our defense, and not until then. In the war of the Rebellion this was not brought home to us, as both sides depended almost exclusively upon raw levies or undisciplined militia. Had the forces of either side been at the outset such as now compose the armies of Europe, it is scarcely too much to predict that the issue would not have hung in the balance as many months as it eventually did years.

The organization of our standing army of twenty-five thousand men is capable of almost immediate expansion to about fifty thousand, but as we employ it at present it has more than work enough upon its hands; subdivided as it is into small detachments, averaging less than two hundred men each, and scattered over hundreds of thousands of square miles of wilderness.

Our uniformed militia consists of about one hundred and fifty thou-

sand partially organized troops enlisted in the service of the several States, and which cannot be ordered out of the State to which they appertain until mustered into the service of the United States,—an operation, by the way, which would in very many instances be stoutly resisted. Much of this militia has never been in camp, never been exercised in battalion-drill, or subjected to the slightest approach to discipline, and would be quite as dangerous if armed with the arquebuse of the sixteenth century as with the present breech-loading rifle.

One-fourth, perhaps, of our uniformed militia, or somewhat under forty thousand men, have been in camp for a few days at a time,—generally, however, with board floors to their tents, a caterer in charge of the commissary department, and a sufficient number of servants to do all the disagreeable work. They have also been somewhat subjected to a very mild form of discipline, usually a combination of coaxing and bullying called moral suasion. They are thoroughly well equipped, excepting as to trains, and are fairly well drilled. On the whole they may be considered as having begun their training, and as being in a very fair way to be improved upon. But even the best militia we possess can scarcely be estimated as quite prepared to be put into the field for active operations. The remaining three-fourths can hardly be deemed more than raw levies, and would have to be reofficered and put into a training-camp as much as if none of the men had ever seen a musket.

We now come to the most extraordinary feature of our whole militia system. No form of government is supposed to be so arbitrary as military discipline, but, as we know, the rule of our civil government has been applied to our militia, and the officers, except in some instances general officers, are elected by their subordinates. Could anything be more subversive of discipline and contrary to all the military traditions of the world?

The result, however, is that the class from which the officers are drawn corresponds very closely to that of the men whom they command, and although an officer so elected holds a commission from the governor of his State, running for a certain number of years, it is usually believed by his subordinates that, as they have made him an officer over them, he holds such office only during their pleasure,—a belief which, however faulty in law or logic, only too frequently proves true in practice.

In commands where there is the least general intelligence the officers are usually men of much less intelligence and education than in commands drawn from the more educated classes, and officers of any grade whose military knowledge extends farther than the tactics of their arm are exceedingly scarce.

Fortunately, in some States officers are subjected to an examination before being mustered, but as this examination is confined, excepting in rare instances, to the tactics of their arm, it is neither difficult nor

exhaustive, and is not in all cases a guarantee that an officer passing such examination is at all proficient in the drill-room. In nine cases out of ten, were the aspirant for shoulder-straps or for promotion asked to describe the principles of turning a defile, constructing a bridge, either of pontoons or trestles, protecting such bridge when constructed, erecting earth-works, conducting a reconnoissance, or any of the minor operations of war, he would be utterly at sea. Mounted officers also, whose ideas as to the management of a horse are of the most vague description, are not unknown in some of the best commands.

Again, too many officers and a large part of the rank and file of the militia have entered and remain in the service with no idea of improving either themselves or their commands, which they look upon as a combination of military, social, and political organizations, very pleasant to belong to, productive of picnics, "company hops," street parades, etc., with the prestige of having assisted in times past in the suppression of riot and disorder.

Officers have ere now risen to command whose principal recommendation was a certain willingness, coupled with the ability, to provide beer for their commands, and to respond liberally to any call upon their purses, as well as to raise money among their friends and connections in the community at large.

Now, while these troops may do fairly well to suppress riots and to enforce obedience to the laws of the several States, all will admit that the commander who would conduct them to battle against a trained and disciplined foe, after a hasty reorganization and but a few weeks at the most of additional training, upon anything like equal terms, would be courting disaster and defeat.

Much doubtless has been done in some of the States by wise legislation and by conscientious, hard-working officers to increase the efficiency of the militia, and much remains to be done; but the legislation must in the future come from Congress for the benefit of all the States, and the State militia must become in very truth the National Guard, provided by the nation, for the national defense.

Before entering upon the consideration of the organization of the National Guard of the future, let us glance at the possibilities of the present day in the way of invasions. In an exceedingly able article which was reprinted last June in these pages from the *Nineteenth Century*, and which appears to have made something of a commotion among our English cousins, Captain Alexander Kirchhammer, of the Austrian staff, quotes and discusses at some length two reports by General Collinson, R. E., which were read before the Royal United Service Institution, in London, in April, 1877, by Admiral Selwin, in which the liability of Great Britain to invasion, and her inability to repel such invasion, is most clearly demonstrated. And surely if so well-armed, compact, and populous a country, possessing such a complete

net-work of internal communication, a shore-line comparatively so short, and a navy so strong, is liable to invasion, how much more so are we, who have a thinly-settled country, comparatively inadequate communications, an enormous coast-line practically undefended, a very small army, and next to no navy; the only condition in our favor being the distance at which we lie from the other great nations of the world. But we should not look upon this three thousand miles of water as an impassable barrier. It means in the present age at the most but a couple of weeks steaming, and before we knew where to expect the blow we would find a large army intrenched upon our shores and our principal maritime cities bombarded. Will *then* be the time to prepare for war? Are we *then* to call for troops, construct ordnance and ordnance stores of the latest and most approved pattern, raise and discipline an army, and rebuild our long-neglected navy?

With the aid of steam transports, guarded by ironclads armed with the improved ordnance of the present day, what is there to prevent a thoroughly organized army, landed upon the shores of the Chesapeake, from seizing upon our national capital, and, ere we could confront it with adequate force, penetrating across Pennsylvania, as would very possibly have been Lee's course had he been successful at Gettysburg in 1863, thereby cutting the country in two, and paralyzing all its industries by the devastation of the coal-fields, and the consequent stoppage of our coal supply, enabling himself at the same time to operate against our then divided forces on interior lines, attacking them in detail, while he occupied one of the richest and most populous portions of our country?

A small detachment of fifteen or twenty thousand men would undoubtedly be soon crushed out of existence by the repeated attacks of overwhelming numbers, while an army of one hundred thousand men would as easily overcome any but skillfully-directed attacks made by disciplined troops, owing to the want of cohesion and impossibility of directing untrained masses.

As instances, we may with profit contemplate Alexander's conquests over millions of armed Asiatics with a mere handful of Greeks, and Xenophon's retreat through the countless hordes of Western Asia. Napoleon's campaigns also contain numerous instances illustrative of this fact.

It is not within the scope of this article to point out the vulnerable points in our country, although many such doubtless exist, and in the foregoing pages the aim has simply been to show that we are not at the present time equipped for war, as well as the possibility, as a military problem, of a foreign invasion. We will now turn to the consideration of the means of defense with which the spirit of the age calls upon us to arm and prepare ourselves for war, in this our time of peace.

Many will no doubt say that, being a maritime country and without

powerful neighbors, we should keep up at all times a very powerful navy. Doubtless such a navy would add greatly to our strength, but, like most other republics, we are impatient of the expense involved in producing, and particularly in maintaining, a really formidable navy.

There has been much improvement in naval architecture of late years, and it will probably be many years ere the type of vessel is produced which will stand the test of time. Had we, some ten or fifteen years ago, become possessed of the most powerful navy in the world, it would by this time have become antiquated and out of date if not replenished and kept up at vast expense. And even now there appear to be nearly as many opinions as to the typical war-ship of the future as there are persons conversant with the subject; therefore, while it is well for us to maintain a sufficient navy for the protection of our mercantile interests in foreign ports, and to encourage by every means in our power the building of merchant steamers suitable for, and with a view to their conversion into cruisers and transports, it would seem inexpedient for us, at the present time at least, to attempt becoming and remaining one of the first naval powers of the world; more particularly, as we have no foreign possessions worth defending or protecting. As an offensive weapon the navy is most powerful and necessary, and when we determine upon the desertion of the policy of non-intervention in European affairs by which we have been thus far guided, our first step must be the attainment of high rank as a naval power, but purely as a means of defense any but the strongest of navies would appear utterly useless.

All our possessions lying upon this continent, it would seem that we must look to our soldiers for defensive operations at home, as we would look to our sailors for offensive operations abroad, and it is with the former that we are now chiefly concerned.

All the traditions and prejudices of our people from our earliest existence have been opposed to a large standing army, both from the fact that it has been at the hands of the army that most of the republics of earlier times have met their fate, and also on account of the great drain upon the public purse which a large army cannot fail to be; as well as the direct loss which the country would sustain in the abstraction of a large number of her citizens from the production of wealth and their encouragement in habits of idleness and improvidence.

But can we not, through a properly organized skeleton army, supplemented by a thoroughly organized, equipped, and trained national militia, place ourselves in a very much stronger position than we have ere now occupied? Would a National Guard of three or even four hundred thousand men be too large for a nation consisting of fifty millions of people and extending over half a continent? And should it be objected, as it doubtless will, that such an extensive armament under the orders of the chief executive would be a constant menace to

our national life, such objection would be very easily obviated by a legal provision that no part of the National Guard should, in time of peace, be transferred from the State in which they belonged into any other State without the permission of the governor of each of the two States; or, failing this, an act of Congress declaring it right and expedient that a given number of troops be assembled at a certain place on or about a day and date to be named in the act, and for a specified time and purpose. A provision of this kind, which would place it beyond the power of the President to use any part of the National Guard in time of peace outside of the boundaries of its own State, excepting by and with the consent of at least two governors or a special act of Congress, would not interfere with their proper training and discipline, and would not impair their efficiency in time of need.

This body of troops should be organized into regiments, brigades, divisions, and army corps, under the command of the President of the United States, through the regular military channels. The brigade, division, and corps commanders, or, at any rate, their chiefs of staff, and the latter, being officers of the regular army assigned to duty with the National Guard, with increased rank while on such duty. All regimental and company officers should be appointed after competitive examination—which should be thorough and exhaustive—covering the various branches of military art and science, and which should be supplemented by periodical examination to ascertain that officers were improving themselves and using the means of improvement which should be placed in their way in the following manner:

In each brigade the regular officer serving upon the staff or as brigade commander should be charged with the instruction of the officers of his brigade in the rudiments of the military art, either by lectures, of which notes should be taken and abstracts written by the officers, or by frequent examinations, either oral or written, upon the various subjects treated of by military writers; the subject of each examination being given out long enough in advance to enable every officer to prepare himself without its materially interfering with his private avocations.

The second lieutenant—and every officer should be required to pass through this grade—should possess a sound English education and general intelligence, and be proficient in the tactics of the arm with which he is to serve. Having achieved this rank, he should then be eligible to any position in his regiment which might fall vacant to which he could attain in competitive examination.

The combatant staff should be detailed from the line, to which they would return after a specified period of staff service.

The non-combatant staff should be appointed to the lower grades with reference to their fitness for the position to be occupied, and secured of advancement as vacancies occurred, in proportion to the abilities

which they displayed in the affairs and management of their several departments.

This National Guard should be thoroughly equipped for the field in every detail, and the portions of its equipment not in constant use, such as tents, baggage-wagons, blankets, etc., which would be unnecessary excepting in the field, should be stored ready for immediate use in arsenals, subject to the orders of the division or corps commanders, and only issued when required in the course of training.

A rifle-range, even if not extending a hundred yards in extent, should be established within reach of every command, and the men carefully and systematically instructed in shooting. When longer ranges can be obtained they are undoubtedly most desirable, but the man who shoots *very* well at one hundred yards will, after a few experiments, do fairly well, at least, at longer ranges; and with the rifled musket of the present day the marksmanship of the individual soldier has assumed an importance unknown in the past.

The objection will doubtless be made that it would be impossible to enlist so large a number of men as this establishment would require, but this is by no means certain. However, should this objection prove well founded, it would have to be met by enforced service. It is a principle thoroughly in accord with the spirit of our institutions that every citizen owes military service to the country should its safety demand his services, and to this principle our government has fully committed itself by the drafts during the war of the Rebellion. Being a popular government, can anything be more reasonable than that the people, or a portion of them, should be required, and if necessary compelled, to prepare themselves for its defense? More particularly as the demand upon the soldier would not exceed an evening or two a week for drill and a few weeks each year in camp, the latter paid for at an equitable rate.

Another important improvement in our future National Guard—and one without which it cannot attain to a high degree of efficiency—should be in the *enforcement* of discipline. The greater portion of the militia of to-day are in their attention to their duties guided simply and solely by their own sweet wills, and such a thing as discipline or obedience being enforced never for a moment seems to occur to them. If a soldier is insubordinate or negligent of duty he is perhaps dishonorably discharged, and should he desire to re-enter the militia he promptly destroys his discharge and re-enlists in another command. There are laws upon the statute-books of many of the States for the punishment of military offenders, but for some unexplained reason they usually remain a dead letter. Excepting in case of removal of residence to a distance, or some very important consideration, it should be made almost as difficult for an enlisted man to obtain his discharge before his time of service expires as it is to-day in the regular army.

Both officers and men while held to a strict accountability for all their duties, which should be so clearly defined that there could be no mistaking them, should be secured in their rights and privileges, and be made to feel that they could not be arbitrarily or unjustly interfered with by their superiors. This would do more towards improvement of discipline than any one feature which could be introduced; for as our militia exists at the present day, any non-commissioned officer or lieutenant who, justly or unjustly, comes under the displeasure of his company commander, or any officer of the regiment who may incur displeasure at regimental headquarters, will, unless he has powerful friends in higher official circles, very soon find that his only hope of a quiet life lies in sending up his resignation, be the rights of the case what they may.

The proportion which the various arms of the service should bear to each other is a consideration in which we can scarcely be guided by the established theories of army organization. And it would seem as if infantry, together with foot, and garrison artillery, should receive our principal attention, owing to the practical difficulties which present themselves in the mounting and horsing of cavalry and horse artillery. Efficiency in militia cavalry is a thing very difficult of attainment, owing to several causes, among which the most prominent are the greater amount of training required by both men and horses, and the attendant expense. The only circumstances where any great proficiency could be expected would be where the horses were owned by the men and were enlisted as much as their riders. We should therefore be obliged to depend in a great measure upon our regular cavalry, which, in proportion to our regular infantry, might be very greatly increased.

What has been said of cavalry holds true in a less degree of horse artillery, though much may be effected towards the perfection of this arm without the batteries being horsed.

So extensive an organization as is here proposed would doubtless entail a considerable annual expenditure, but in contemplating this expense we should take into consideration less the precise number of dollars which would be annually consumed than the benefit which would accrue to the country, and the security which we should enjoy.

In the event of our suddenly finding ourselves precipitated into a war with a powerful opponent in the present state of our preparation, or rather want of preparation, for such an event, we might reasonably look for a very prompt and powerful invasion, with the hope on the part of our antagonist of inflicting upon us a crushing disaster, and terminating the war at a blow, rather than far less active measures which would produce a lingering conflict, giving us ample time to prepare ourselves ere anything decisive were attempted against us.

It is in such an emergency that we must look to a National Guard as our main bulwark and defense.

We must develop a portion of the strength accumulated in our hundred years of national life, and then, and not until then, shall we take our proper place, and our voice command attention and respect in the councils of nations.

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ANCESTRAL WORSHIP AND THE WORSHIP OF THE DEAD AMONG THE CHINESE.

NOTWITHSTANDING the commercial relations existing between China and the West for several centuries, and the rapid means of intercourse with that country at the present time, very little seems to be known of some of the peculiar religious beliefs of her people.

During two years the writer passed in the East he was surprised to find that Europeans and Americans long resident in the country, either from indifference or engrossment in commercial pursuits, knew little of the matter. Among the missionaries, however, there were several who had paid much attention to the subject. He would especially mention the Rev. Mr. Yates, who for many years has sedulously labored among the Chinese, of whose valuable researches he has freely availed himself.

Before explaining the theory of the Chinese with regard to ancestral worship and the worship of the dead, it will be well to take a brief review of the three prevailing religious sects in China, namely, Confucianism, Tauism, and Buddhism.

Confucianism was founded by Confucius five hundred and fifty years before the Christian era, about the time of Cyrus and Solon. This is the religion of the *literati* and higher classes, the emperor being its patriarch. The image of Confucius is placed in all academies and schools, and master and pupil are obliged to prostrate themselves before it at the beginning and end of the classes. The doctrine of Confucius is founded on a philosophical pantheism. His disciples are taught to respect parental authority, to be charitable, to love their neighbor, and to renounce self.

Tauism. This was founded by Lotze about the time of Christ. The priests, who are called doctors of reason, practice magic and necromancy, and teach many superstitions, of which more will be said hereafter.

Buddhism, called in China the religion of Fo, was introduced from India about the first century of our era, and is supposed to be a reformed Brahminism, which originated in the north of Hindostan about six centuries before Christ. Buddha was a divine incarnation, sent on earth to enlighten man and to redeem him. Many of its external rites bear a singular resemblance to those of the Roman Catholic Church,

namely, the ritual, the incense, the rosaries, the vestments of the priests, the monastic life, the celibacy of the clergy, etc.

This resemblance was noticed by a Catholic priest who visited the country more than a century ago, who attributed it to the designs of Satan. It has also been remarked by Sir I. F. Davis, Father Huc, De Bourboulon, and other modern travelers.

The image of Buddha is placed on the main altar, and that of his mother, Tien-Moo, Holy Mother, on a side altar in all the temples.

The three forms of religion above mentioned have no great hold on the popular mind, and are mutually tolerant of each other. In fact, religion appears to have less influence in China than in any country whatever. The Chinese are practically materialists, being only ardent in the pursuit of riches and worldly comforts and enjoyments. Little or no sanctity is attached to their places of worship, where they may be seen daily, lounging, smoking, and drinking tea, except when they are engaged in their devotions.

We come now to the consideration of ancestral worship and the worship of the dead, an observance which unites all creeds and all classes of this vast empire, with its four hundred million inhabitants, into one fraternity. But first let us give some account of the theory of the Chinese with regard to the dead.

They believe in the existence of two worlds,—one the world of light (China), the other the world of darkness, in which men live after death. They conceive that the denizens of the latter world stand in need of the same kind of comforts that they enjoyed in their former state of existence, and that they are entirely dependent for their comforts upon their friends and relatives in the world of light. They also believe that the inhabitants of the world of darkness can see their friends in the world of light, and that it is in their power to return in an invisible form to afflict or reward them, according to their fidelity in making the necessary offerings for their comfort in the spirit world. They believe that those ancestors who are neglected by their relatives, as well as those whose families are extinct, are consigned to a state of beggary, and are forced to take position with the multitudes who have died at sea, in war, or in foreign lands, who, in consequence of their burial-places being unknown, are entirely dependent on public charity. The presentation of offerings to the latter, as will be hereafter explained, is called the worship of the dead.

It is supposed that these neglected spirits, in attempting to avenge themselves, prey upon those in the world of light who are in no way responsible for their sad condition. Hence they believe that sickness and other ills to which flesh is heir are inflicted by these unfortunate spirits, or by the ancestors of those who are unfaithful to their dead. The government of the world of darkness is supposed to be a counterpart of that of China, from the emperor down to the lowest coolie. It

is likewise believed to be alike in character, and is supposed to be influenced by similar sordid and selfish motives. The Chinese have no knowledge of God, as the Supreme Ruler of the universe, and have no character in their language to express the existence of such a being. Hence they have no higher standard of justice and probity than they see exhibited by their own officials. The government of the spirit world is represented in the world of light by the numerous idols and their attendants to be seen in the Tauist temples and elsewhere. The superiors reside in the temples, whilst the subordinates are placed in various parts of the city, like policemen, to guard against the depredations of the turbulent beggar spirits. They may be seen in niches at the city gates, on the bridges, at the corners of the streets, etc., where offerings of candles and incense are made to them. The Tauist priests are the interpreters between the world of darkness and the world of light. Hence they are in a position to deceive and oppress the people, and they have not failed to abuse their privileges.

The Chinese believe a man has three souls,—one in the head, one in the chest, and one in the lower extremities. At death one of these souls takes its position with the ancestral tablet (to be spoken of directly), one with the corpse, and one goes into the world of darkness for trial and punishment.

The ancestral tablet consists of a piece of board resting on a pedestal, upon which is written the name, date of birth, and death of the deceased. Those of the wealthy are gilded, and often highly ornamented. These tablets are placed on a table or altar in the house, except among the rich and distinguished, who have an ancestral hall attached to their dwellings, where the family tablets are kept, in charge of a custodian.

The Chinese believe in the immortality of the soul, and in certain kinds of rewards and punishments. The rewards they most desire are, first, to be exempted from punishment in the lower world, and, second, according to their ideas of metempsychosis, to be promoted in their next appearance into the world of light to a more honorable position. The punishments are a reflection of their criminal code, and are of the most brutal character. Near one of the gates of Canton there is an exhibition of colored statues, representing to the life all the horrors of roasting, flaying, severing of limbs, sawing asunder, death by immersion in cauldrons of boiling oil, and various other barbarous modes of torture.

The practices of the people in regard to their dead are exceedingly curious. When any member of a family falls ill the other members sacrifice and worship before the ancestral tablets. If the sick person does not improve they afterwards call in a medium, to see if the trouble is caused by their own ancestors or by a beggar-spirit. If by the former, they burn a large quantity of *din*, or paper-money, before

the tablets; but if by the latter, the *din* is burnt without the door, to appease the discontented spirit. *Din* is made of gilt or silvered paper, cut in the shape of a coin of the country, which they imagine passes current in the other world. If the sick person becomes delirious or his extremities cold they suppose one of the souls has left the body, whereupon some member of the family, with a lighted lamp, stands at the door, and calls the departed by name to come back. If he die, the first thing they do for his comfort is to place a glass of water at the door, in order that he may take the last drink. Next they burn a suit of clothes, so that the spirit may be well dressed on his arrival in the lower world, as they suppose the police is influenced there by personal appearances. They next proceed to burn a great quantity of *din*, which is to enable him to bribe the police to allow him to escape before reaching the higher authorities. Meanwhile all the relations and friends of the deceased send in their contributions of *din*, to enable their departed friend to bribe the officials of the land shades, or to pay the prison-keepers, and thus greatly ameliorate his condition, if he has been so unfortunate as to be imprisoned.

When a man is dead he is in a position to avenge himself of all the injuries of which he may have thought himself the subject; hence the large contributions made by friends and neighbors who feel that the deceased had aught against them. It is not an uncommon thing for a widow to go to the grave of her husband in order to make known to him some injustice she has sustained, and beg him to see her righted or the oppressor punished.

The spirit of the deceased person is supposed to return to its old habitation from the ninth to the eighteenth day of the following month, bringing with it a host of ravenous beggar-spirits to aid it in its revengeful visitation. The family, in order to counteract the baneful influence of this visit, employ Tauist priests, whose gods rule the spirits, to perform at the residence the ceremony of *Kong-tuh*, the object of which is to oppose or frighten away the spirits, and thereby secure tranquillity to the family.

All the relatives and friends of the deceased are invited to take part in this celebration. The family hall, or room, as the case may be, is decorated for the occasion with various devices and emblems of authority used in the lower world. The ancestral tablet of the expected visitor is placed on a table in the centre of the hall, where all the family being assembled, humbly kneel, confessing their shortcomings to the departed. Tauist priests, attired in splendid robes, march up and down in front of the tablet, chanting and bowing to the ringing of a small bell used by the master of ceremonies. Finally the officiating priest, turning towards the audience, promises that all who have assisted at the solemn sacrifice may be assured of receiving some particular favors from the deceased ancestor in return for the grateful

oblation made. The guests are then invited to partake of the refreshments prepared for them, and at the same time a table is spread in a vacant room for the accommodation of the spirit-guests, abundantly furnished with viands, fruits, sweetmeats, etc. At the close of the feast one of the priests enters the vacant room with a drawn sword, cuts the air to the four points of the compass, and orders the spirits to depart, and, on pain of the severest punishment, not to disturb the peace and quiet of the family. The spirits, terrified at the sight of the sword and the emblems of authority in the lower world, together with the sound of the gong and the deafening noise of the fire-crackers, which are liberally used on such occasions, are supposed to return to their proper place of abode. The friends then pay the priests' bill, and take their word for it that the spirits will not trouble them again.

The writer was an eye-witness of the ceremony of ancestral worship in a family of wealth and high position. On this occasion there was a great profusion of offerings, such as sweetmeats, cakes, fruits in every variety, fowls, and a large fat pig and goat, skinned and stretched out on stands at each side of the table on which the tablet was placed. Several bushel-baskets of *din* were consumed by fire and quantities of fire-crackers were set off, while a number of musicians kept up a fearful noise on discordant wind instruments, a huge drum, and several loud-sounding gongs. The whole family was present, even to the smallest children, with numerous relatives and friends, all dressed in their finest robes.

The priests, as agents and interpreters of the gods, receive large revenues from this source, as well as for getting poor unfortunate spirits out of supposed difficulties in the lower world, which they manufacture in order to deceive. But the relief afforded a spirit in the Chinese purgatory is only temporary. They only propose to extricate him from present suffering. A heaven, or place where the good are at rest, is not predicted by any of their systems of religion. Those who are in the world of darkness must be supported as men are in the prisons of this world,—by their friends; hence the great necessity of ancestral worship. To provide for the proper execution and perpetuation of this is the great concern of life. It must be executed by a son or a blood relative of the male line, consequently the necessity of providing for the perpetuation of the family name. It is by inheritance the duty and privilege of the eldest son, or his heir, to perform this sacred rite; hence he inherits a large portion of his father's estate. These facts show the deep hold ancestral worship has upon the Chinese mind, and explain their great preference for sons over daughters. A man with many sons is considered blessed, while one with many daughters is commiserated. Under these circumstances one can readily imagine the estimate placed on an only son, on whose preservation and

fidelity hang the future hope and happiness of all past generations of the same name. Should he die before he has male issue, or should he become a Christian and repudiate ancestral worship, all his ancestors, by that one act, would be consigned to a state of perpetual beggary. To become a Christian must therefore require an immense amount of moral courage, for the individual who takes this step would call down upon his head not only the anathemas of his own family and friends, but those of all his ancestors.

Ancestral worship takes place during the month of April, and three weeks are appointed for this observance. It is called *Ching-Wing.* Ceremonies take place at the graves similar to those used before the household tablets. Offerings of fowls, fish, fruit, candles, incense, etc., are made, and quantities of *din* burned and fire-crackers set off. The offerings that are consumed are supposed to be transmitted in an available form to the spirits for whom they are designed. What remains is carried home, to be used at the family feast, which takes place afterwards.

However much the Chinese may be divided as regards religion, dialects, degrees of wealth, station, etc., they form a unit with regard to this rite. A man may be a highway robber, but he will return home at the regular period for worship at the ancestral tombs; this is an imperative duty, and when faithfully performed covers a multitude of sins. A man may disregard any or all of the other forms of religion, but this he dare not. In fact, it seems to be the sole idea that excites in the Chinese mind a feeling of awe and reverence.

The worship of the dead. The observance of this analogous rite takes place three times a year for the benefit of the poor dead, and for those whose tombs are unknown, who have died at sea, in war, or in foreign lands. Public contributions are made for these offerings, and at the celebration of these festivals there is a grand parade of the idols of the city. During several succeeding nights a deputation of priests, with gongs, followed by a grand procession, carrying lanterns, torch-lights, and a large supply of *din*-money and fire-crackers, march through the streets, burning the one and setting off the others at every cross-way, bridge, jetty, etc. They suppose the dead, who have no one to sacrifice to them, are wandering about in a forlorn condition, like beggars, seeking for means of comfort and support. The distribution of this charity continues until a portion is supplied to every place thought to be frequented by the destitute of the world of darkness.

The amount of money expended in endeavoring, according to the theories of the Tauist priests, to appease the millions of beings in the other world has been estimated at not less than 150,000,000 dollars annually. The living are thus made the slaves of the dead. All classes, from the highest to the lowest, stand in dread of the spirits of the departed, whether of their own ancestors or not, if they fail to ad-

minister to their comfort. The least noise heard about the house at night, as a window or a door shaken by the wind, is taken for the call of a hungry, distressed spirit, and to insure quiet the family hasten to burn some *din*-money outside the door.

From the above sketch, one can readily imagine what a powerful influence ancestral worship has upon the popular mind of the Chinese; in fact, it may be called the true national religion of the country, Buddhism, Tauism, and Confucianism being only adjuncts. It is by far the most formidable obstacle to the spread of Christianity as well as of civilization, for through its influence they are literally chained to the past. They invent nothing, improve nothing, and are evidently retrograding.

Until quite recently the mere suggestion of constructing a railway or cutting a new road struck terror into their superstitious minds, for the tombs of their ancestors, which lie thickly scattered over the land, would of necessity be disturbed by such innovations, and the consequences of this sacrilegious act would be deemed calamitous, not only to themselves, but to their country. But this vast empire, which has held together for so many centuries, like its famous wall, seems to be crumbling to decay. The central government exerts but little authority over the provinces, and a dissolution of the ancient fabric appears to be inevitable before many years. When this occurs more liberal ideas will gain entrance into the land, and with the march of a more enlightened civilization the spiritual darkness which has overshadowed it for ages will gradually vanish away.

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INFANTRY.

III.

"*L'Infanterie est la nation des camps*, c'est le peuple rassemblé, discipliné, hierarchisé, organisé; c'est une députation du peuple prête à recevoir le feu sacre pour le porter ensuite sur toute la surface du territoire.

"L'armée vient du peuple et y retourne; elle touche au pays par tous les points; elle est nationale. L'organisation sociale et politique du pays a ses reflets dans l'organization de l'armée."—MM. DE BARANT ET PASCAL.

"Tant qu'on voudra attaquer de *bonnes troupes, comme les troupes anglaises*, dans de bonnes positions, sans reconnaître ces positions et s'assurer si on peut les enlever, on me conduira des hommes à la mort en pure perte."—*Nap. Corresp*, 15,695.

"L'affaire de Magenta fut décidée par la persévérance et la tenacité du *soldat français, qui était bon marcheur*, indépendant et libre dans son action individuelle."—*Relation de la Campagne de* 1859, *par l'État-Major Prussien.*

"L'infanterie est l'Arme qui, reduite à elle-même, peut faire le plus longtemps de grandes choses. Plus la tactique se rapproche de l'homme, plus, en tout temps elle est forte. Cette maxime incontestable n'exclut point l'utilité des moyens accessoires, des effets auxiliaires que l'homme a imaginés pour servir dans une foule de circonstances sa vigueur individuelle; seulement il est manifeste qu'à la guerre tout ce qui n'est pas l'homme perd sa force à mesure qu'il s'éloigne de cet être privilégié et créateur. En un mot, l'Infanterie est également propre au feu, au choc, également redoutable en tous lieux, en tous temps; l'Infanterie possède seule une réunion de forces et de ressources qui en fait le corps essentiel d'une armée."—*Esquisses Militaires.*

"Infantry is the Arm which by and of itself can accomplish and keep on producing, for the longest period, the grandest results. The more that Tactics accommodate themselves to Men, the more, throughout all time, they are powerful. This incontestable maxim does not exclude accessory means, auxiliary effects which Man has conceived to augment in a multitude of circumstances his individual power; only it is manifest that in war everything which does not appertain to Man himself, loses its force in proportion as it gets farther and farther away from this privileged and creative being. In a word, Infantry is proper for firings, for shock; equally formidable on all kinds of ground; at all times. Infantry alone possesses in itself a re-union of the forces and the resources which make it the real essential body of an army."—*Esquisses Militaires.*

IN resuming this series of articles on Infantry a few words may not prove unacceptable in regard to the derivation of the title. From these it will be found that even as the other services to this day endeavor to hold themselves up above this, the "Queen" of all, even so, in former times, the germ of its name had no connection with chivalry or consequence, but the very contrary.

The etymology of the word Infantry—French, *Infanterie* and *Fantassin*, according to General de Vaudoncourt—is not deduced from the Greek or the Latin, but from the ancient language of Gaul, and these words are still to be found in the Erse or Gaelic, which is a derivation from, or allied to, the Gallic. *Fan* signifies a march on foot, or "military promenade," an expression still retained. Thence results *fantair* or *fantais*, indicating a "marcher" or a "footman," whence the Italians took the word *fante*, having the same signification. General Bardin (Dict. de la Con., xxvi., p. 298) tells us that *fantassin* corresponds to the old substantive *fanterie*, which was still written *fantachin* in the time of Henri-Estienne. Bardin says the root is Italian, and is a corruption of *fante* or *fantoccino*. This is the reverse of Vaudoncourt's opinion. According to Baretti, the original meaning of *fante* is a man-servant, and it is only by extension that it came to mean foot-soldier; and *fantoccino* means a stupid creature, as if it required no mental capacity to be a foot-soldier, which is almost a parallel to such derogatory epithets applied to the infantry by the cavalry,—as "mud-mashers," "foot-wobblers," etc.

Perhaps there is no better proof of the low estimate set upon Infantry, prior to the adoption of this title, than the epithets previously applied to it,—*Maheutre*, a term used in an opprobrious sense by the Roman Catholics in regard to their Huguenot or Protestant adversaries, which was never justified by the latter's military qualities; for, take them one and all, France never could boast their equals as soldiers. Infantry were likewise styled *menadiers*, almost equivalent in one sense to "rabble"; *paonniers*, which may be traced to a root indicating a bunch of feathers, signifying that infantry were only good to make a show in line of battle, as a peacock distends its tail; *pions*, "pawns"; *pionniers*, "laborers," simply to construct defensive works, etc.; *brigants*, which explains itself; and finally, *compagnons*, which originally meant what "fellow" does to-day.

Even in 1776, a "Memorial in Regard to the Vices and Abuses of the Actual Condition of the French Military Establishment" contains the following passages: "The majority of the soldiers are derived from the rabble of great cities and from people of no account. . . . The soldier, ranked with the lowest condition of society, owes the degraded state into which he has fallen to the vice of such an origin. The vagabond as well as the citizen are both of equal value to the recruiting agent, provided either possesses the requisite height and costs but little. . . . Is there a father of a family who does not shudder to commit his son, not to the risks of war, but to an association with a crowd of unknown brigands a thousand times more dangerous?" (Lt.-Col. Jung, "Bonaparte," i. 131, 133.)

Another opprobrious term is mentioned in the "Esquisses Militaires," —*Piquiquini*, not to be confounded with Piquiers (Pikemen who did

not as yet exist), who were Peteaux and Bebeaux (Scrubs and Guzzlers?); Goujats (soldiers, hangers-on, a term once used in connection with Marshal Gassion by Condé); Peasants armed with staves and arrows; Valets; in fact, soldiers who composed an inferior Infantry. While the French and other Continentals seemed to look with contumely on their foot-soldiery, the English monarchs and leaders, wiser in their day and generation, always held their Archers in high esteem, and the government, by supervision and wise enactments, saw closely to the efficiency both of the men and their arms.

No military author or expert has ever furnished anything like such a magnificent picture of the birth and growth of French Infantry, and its baptism of blood and fire, as Michelet in the seventh volume of his history of France, "La Renaissance," which was coeval with the discovery of America by Columbus.

While he attributes the European revolution in military affairs to the French, he admits that England had Infantry in the grand sense of the word over a century previous.[1] He attributes the organization

[1] Marignano, "the Battle of Giants," a victory which has always been attributed to the knightly valor of Francis I. and the French chivalry, was in reality won by the newly organized and comparatively despised French footmen. (Michelet, vii. 454–456.)

The grandest battle, however, in which the Swiss played the principal part, was that of Marignano or San Donato, 13th and 14th September, 1515. It has been often styled the "Battle of Giants," and in some respects it was so.

Francis I., with forty thousand men, the best troops of the day, was at Mariganno or Melegnano, ten miles southeast of Milan, having in his front the Swiss, and in his rear the Spanish and Pontifical Armies; the Venetians, it is true, were looking after the latter, but it was questionable if they had any troops who could match the redoubtable Spanish Infantry. The French advance guard was protected by a wide ditch and seventy-two pieces of artillery, supported by a Corps of Lasquenets or German mercenaries. The French were surprised, and when night came they underwent the peril of a total defeat, for they had extinguished the fire of the battery which did them most damage by an enormous sacrifice of their best men, filling up the wide ditch in front of it with the corpses of the French Foot slain in defending the guns.

The battle continued by the light of the moon amid the strangest confusion. When completely exhausted, both sides sank down to repose. The Swiss leaders sent off dispatches in every direction to announce a victory won.

It appears that wine was, at all events, abundant, certainly among the Swiss, but the French had little or nothing to eat. Their King, Francis, was forced to wash down his supper with tepid water mixed with blood, and this repulsive draught acted as an emetic; then he fell asleep exhausted, reposing on the flask-trail of cannon.

All night through the terrible Swiss horns were heard sounding to rally their people, and were echoed by the French trumpets signaling for the same purpose. When morning broke, the French Army was reformed under the cover of seventy-two heavy guns and an infinite number of smaller pieces. The Swiss attacked again and did wonders. It was not until about 10 A.M. that they began to abate their efforts, on beholding the advance of the Venetian Army. By this time they had lost one-half of their number, fifteen thousand, and fell back, common time, un-

of the French foot to Louis XII., and remarks that chivalry, gendarmerie, and the whole old military organization went to the winds together, and that the people in the French Infantry manifested their force on the field of Ravenna, Easter Sunday, A.D. 1512.[2] It was the

daunted, scarcely followed up, carrying with them,—not having any horses,—by strength of arm, the cannons they had captured.

It is said that never was a victory more complete than this won by the French. Yes, by money,—the remnants of the Swiss Infantry were still so formidable that Francis was obliged to gorge them with his gold and silver. Bribed, not beaten, they accepted more money than Switzerland was worth, and thus selling the fruits of their victories, they retreated out of Italy.

The world has at no period witnessed a grander exhibition of fidelity than had been exhibited by Swiss Infantry.

When Louis XVI. was abandoned by his native nobility and troops, his Swiss guard suffered themselves to be massacred to the last man, and their valor, fortitude, and devotion is fitly commemorated by an exquisite monument admired by every traveler who visits their native country in the vicinity of Luzerne; while at Soleure, the stranger who enters the old Arsenal is saluted as he opens the door by the figure of a Swiss soldier belonging to the redoubtable Infantry of the eighteenth century, which presents arms moved by machinery communicating with the portal.

[2] Let us bear in mind that "*Military fraternity* is a holy thing," says (to translate) the great French historian Michelet.

* * * * * * * *

"A community of dangers and of habits creates one of the strongest bonds which can link men together. In the ancient North it constituted a mutual brotherly adoption between warriors,—a sort of holy military marriage tie."

This principle, this bond, has more than once saved a cause and an army; and, fostered as it should be between our Regular Army and our Uniformed Militia, in case of sudden war, will save our country.

The following is a wonderful example, which would impress any one, on reading it attentively and reflectingly, with its truth. It is sufficiently interesting to justify its repeating here. It dates, it is true, a long while ago, but as human nature is human nature still, whether under the cloth uniform of the nineteenth century or the steel cuirass of the sixteenth, it is not inappropriate.

Reader, go back to the BATTLE OF RAVENNA, fought on Easter Sunday, 11th April, 1512. This was the era of the apparition of the French Infantry,—that infantry who are the best marchers in the old world, and, consequently, the most military. The almost incredible celerity of their movements—a celerity demonstrated throughout three hundred and fifty years of almost continual combat—led the celebrated Marshal Count Saxe to declare that "battles are gained not with the hands, but with the feet." This military axiom is now attributed to Napoleon, as is the case with almost every wise military saw in vogue. Thinking men have always maintained that Napoleon was *no originator, but an appropriator rather than a perfecter*. He robbed mind just as he robbed kingdoms.

"The French army of 1783," said Lessac, "possesses a genius more warlike than the body; whereas, on the contrary, the German army as a body more warlike than the genius."

Well, at Ravenna, the French-born portion of it was young, and its general was young likewise,—only twenty-three years of age, brave, fiery, energetic, and inexperienced; but he had tried, veteran commanders under him.

The French infantry were in reality no better than *mobilized militia*,—the greater part, in fact, were styled (*aventuriers*) soldiers of fortune, adventurers, volunteers,—enthusiastic, bold, active, and possessed of all the fine natural soldierly qualities. Twenty-four years previous, Francis I., while congratulating himself on

people transformed into admirable soldiers who accomplished the marvelous Passage of the Alps by Francis I. in 1515, which approaches that of Hannibal, and so far transcends that of Bonaparte, in 1800, that it is almost an insult to institute a comparison.

the establishment of those National Legions, had as yet but little confidence in this comparatively untried force. Alongside of them they had examples of firmness in the solid veteran German footmen, serving under the Bourbon banner.

Here, reader, we have the very conjunction previously cited, Regulars combined with Mobilized Militia or Volunteers.

The most popular man in the French army was that knight "without fear and without reproach," the veteran Bayard.

His particular friend, a man unsurpassed in bravery and honesty, an old, modest, firm soldier, Du Molard, was induced, by the king's own influence, to give spirit and respectability to these new levies; to accept the command of the Volunteers. In camp, in fête, in battle, but more particularly in the charge and the assault, they were always together.

Bayard had another devoted friend, Jacob Zemberg, the commander of the German veterans. Their friendship—which dated from Bayard's first manifestation at the siege of *Padua*—was a strange affinity. Jacob Zemberg met him often, followed him about, regulated his own conduct by Bayard's, yet could not converse with him, for he knew but two words of French: "Bon-jour, Monseigneur"—"Good-day, my Lord."

On Good Friday Eve, 8th April, 1512, the French and Spanish armies stood face to face under the walls of *Ravenna*. Details disconnected with the main facts are omitted, unless they illustrate the case in point.

A courier gallops into the camp; he brings to Jacob Zemberg a dispatch from the Emperor, *his* master, commanding the German captains, on pain of death, to abandon the French service forthwith.

The German leader was perplexed indeed. What! although a German, and his comrades Frenchmen, on the eve of a decisive affair, demoralize the army by withdrawing five thousand veteran pikemen, who, according to the tactics of the times, constituted the main reliance of the army! Not he. He called his interpreter, and sallied forth to consult Bayard, who counseled him to put the dispatch in his pocket,—as did Prince Eugene before the Battle of Zenta,—and pay no attention to it for one or two days.

In that time the battle would be decided.

"I admit," argued Bayard, "you are a German, and the subject of the Emperor, but then you are the King of France's soldier, for you eat of his rations and handle his pay."

So the French general had three days to conquer in.

The same thing happened to Frederic the Great, before the battle of *Burkhersdorf*, which resulted in the capture of the celebrated fortress of *Schweidnitz*, in 1761, only on that occasion the Russian contingent would simply afford him passive, not active, support on the day of battle.

Still, the effect was the same.

But let us return to *Ravenna*.

On Holy Saturday, 10th April, 1512, the French army, under Gaston de Foix (nephew of Louis XII.), composed of French, Germans, and Italians, having chivalrously crossed the *Ronco*, fronted the Spanish forces under the *Viceroy* (of Naples, Raimond II.) Cardona, whose infantry were Spaniards, and cavalry Italians.

The latter occupied a strongly intrenched camp, surrounded by deep ditches inclosed with stakes, beams, and movable *chevaux-de-frise*, or rather, armed carts, worked by hand, barbed on all sides, with three-pronged spears, leaving only a narrow passage for the Cavalry.

General von Hardegg corroborates Michelet. He says that the end of the Fifteenth Century was coeval with the disappearance of chivalry, although cavalry lost its prestige towards the end of the previous one,

Easter Sunday morning, crimson rose the sun, as if to sympathize with that red field which swam with blood before it set.

The French army having leveled the dykes, marched up within four hundred paces of the Spanish lines, and halted there. It soon appeared that victory would be to those who could reserve their strength the longest; could exhibit the greatest passive endurance; could bear without flinching this fire muzzle to muzzle. The loss of life could not but be frightful at such short range.

Cardona made his Spaniards lie down flat on their bellies.

The French historian adds, "without exhibiting any chivalric honor."

The *Viceroy of Naples* was a brave, experienced officer, and did the same as Wellington afterwards at Waterloo. *No greater test of a good general than his avoiding any unnecessarg exposure of his troops.*

His opponents, French and Germans, on the contrary, considering that honor demanded it, stood erect in their ranks.

On that day the young French Infantry had a bloody *Baptême du Feu*, or solemn introduction to the battle-field.

No reliable return of its losses exists, but this fact is known: of its captains, forty in number, standing firmly, to set the example, in the front rank, all perished save two.

This was Real Militia conduct, *a wicked, wanton sacrifice of brave men.*

At this moment, the bold commander of the French Infantry conceived the idea of fêting the real hero of the day, that gallant Jacob Zemberg, so faithful to France, to soldierly fidelity, to *camarderie* (military companionship).

He sent for a bottle of wine, and there, amid the dead and dying, the shattered ranks, the bleeding bodies, and the splintered weapons, the rain and hail of balls and bullets, to their roaring, whistling music, they both sat down and pledged each other; and both, thus, cup in hand, were slain by the same cannon-ball.

"No matter," cries the French narrator, "be it told throughout all ages, on that very day the French Infantry was born, baptized as soon as it had come into the world, in blood and fire." For a gospel-respecting man to quote the rest of the passage would be profanity.

The French foot, furious at having lost its commander, Du Molard, and all its captains, could stand it no longer. They rushed madly upon the Spanish artillery, to revenge their losses, by cutting down the gunners where they stood. Stopped short by a sort of movable rampart, which Pietro Navarro, the celebrated Spanish General of Infantry, had constructed on his wagons, shot down at the muzzles of the guns, charged, and, worst of all, badly led,—for it has been shown *how their officers were permitted to sacrifice themselves*,—they could not have been extricated, but would have been entirely cut to pieces, if the Germans and another regular corps of French Picards had not advanced, received them into their ranks, and covered their retreat.

The ravages of the artillery were not less terrible in Cardona's army, but the loss fell upon the Cavalry,—that is, upon the Italians. Thirty-three, it is said, were mown down by one cannon-ball. These Italians came to the conclusion that Navarro—so economical of Spanish blood—had placed them in the position they now occupied to see them utterly destroyed. Their Commander, the Spanish Grand Constable, Fabricius Colonna, could restrain himself no longer; he ordered the barriers to be thrown open, led out his horse, and charged the French batteries. Taken themselves in flank, and charged through and through by the French heavy cavalry,—composed of stronger men mounted on more powerful horses,—the Italians, after a furious resistance, were annihilated and their Commander made prisoner.

the Fourteenth. Another noteworthy fact is, that simultaneous with the rising importance of Infantry,—that is, of the people as soldiers,—and the decline of the nobility as the only reliable military force, were

The great contest now lay between the Infantry of both armies. The Spaniards in one enormous mass, covered with iron, with their long pointed swords and poniards, sustained, without flinching, the moving forest of German lances which assailed them. Badly led, for Jacob, their Commander, was dead, the latter suffered terribly.

At this critical moment the French Cavalry, victorious over the Italian horsemen, with an irresistible shock fell upon the rear and flanks of the enemy, who were almost entirely cut to pieces; their Commander, a celebrated leader, and an immense number of officers, falling into the hands of the victors.

Bear with the narrative a few moments longer, for every word illustrates the superiority of the practiced soldier over men however brave but inexperienced and headstrong.

By a lengthy and narrow causeway, with a deep, wide ditch on either hand, some bands of Spaniards who had effected their escape were retiring slowly—*common time*—and fearlessly towards the city of *Ravenna*, still in their possession.

Bayard, returning from the pursuit in another direction, caught sight of them, and drew up the small Cavalry Corps which he had with him to charge them.

Thereupon a single Spaniard left his ranks and accosted him gravely, thus:

"Señor, you must perceive that you have not men enough with you [to charge us to advantage; *i.e.*, to effect anything]. You have won the battle; be satisfied and let us go; for, if we get off safe, it is God's will."

The veteran Bayard silently acknowledged the justice of his enemy's words.

His horses were tired out; it was the very place for Infantry to resist Cavalry successfully.

He drew off his men.

Thus ever judges and acts the cool and experienced leader.

A short time afterwards the French General-in-Chief, Gaston de Foix, covered with human blood and brains from crest to spur, came galloping up in the rear of the same body of Spaniards.

"Who goes there?" said he to one of his officers.

"The Spaniards whom we have beaten."

Sinking the General-in-Chief in the Captain of Cavalry, he charged them with a few horsemen attached to his person.

When their pike-points were almost pricking the horses' breasts, the Spanish musketeers fired a volley, and Gaston fell from the causeway into the water.

Then they rushed upon him with their pikes and halberts, hamstrung his horse, and pierced him with a hundred stabs. He had fifteen wounds in the face alone.

This battle, this glorious day, with its faults,—its criminal faults,—teaches more valuable lessons than one, which should be inculcated upon an Uniformed Militia.

First, that Military Companionship—which, fostered, will always blend true soldiers together into one harmonious whole, and knit them one to the other in the bonds of love and respect—saved the French Army.

Second, the discipline of the Regulars was the antidote to the Volunteers' want of it.

Third, the wanton, senseless sacrifice of the officers' lives, and the consequent rash, *mis*directed fury of the young troops, jeopardized the victory which the firmness, the conduct of the old troops—even without their leader—retrieved.

Fourth, the exposure and impatience of the Italian cavalry, their jealous rage, their want of fortitude, or rather, passive endurance under fire,—*the greatest weakness of militia;* their unadvised charge upon the opposing artillery was unworthy really good troops.

the struggles for reformation both in State and Church; and both are due to the invention of printing, and through it the increasing diffusion of knowledge. Yet, more strange to say, the first real embodiment of Infantry and the formation of Camps of Instruction for the Three Arms combined is due to a monarch, Louis XI., who was at the same time one of the most remarkable examples of abject superstition,—a very slave in spiritual matters,—and withal one of the most prospective intelligences that has ever given a notable impulse to modern ideas through the elevation of the industrial classes at the expense of those who had hitherto dominated them and distracted France. His father, Charles VII., or some of his advisers, conceived the organization of a permanent force, but it resulted in a weakling, or, so to speak, perhaps more properly, an abortion. That which Louis XI. engendered came to the birth "a proper child," and has grown steadily, with occasional maladies inseparable from the increment of all things human, into national armaments, such as we contemplate them at this time. The writer regards Louis XI. as one of the greatest soverigns who, "under existing circumstances," ever administered and applied the resources of a country, and if a monarch is to be judged by the benefits he confers upon posterity, rather than by his vices, weaknesses, and crimes as an individual, then this mortal, who trembled before his physical and spiritual physicians, must be regarded as one of the boldest cutters of Gordian knots and most notable benefactors of his species. France owes its consolidation to him, and not to Richelieu, and he converted the heterogeneous mass, which had been so often smitten to pieces by the English, the Netherlanders, the Germans, and the Spanish, into a homogeneous power, which was destined to visit within a little over two centuries, triumphantly, the capital of every European continental nationality. Without the astuteness of Louis XI., Louis XIV. would have been an impossibility; and without the removal by the former, in a measure, of the shackles which crushed the energies of the producing classes and their admission into public employments, the idea which germinated through printing would have been but a sickly child, whose development must have been so much retarded, that the revolutions which have changed the whole aspect of humanity would have been so greatly delayed that even yet, with the witnesses of the Apocalypse under the altar, it would be crying out, "How long!" (Revelation, vi. 10.)

Modern European Infantry, as organized at this day, does not date back more than three centuries. For two hundred years previous there

Then, what could have been finer than the counter-charge of the French men-at-arms?

Fifth, the death of the General-in-Chief and so many valuable officers completely neutralized the effects of the victory.

Every incident is a picture replete with instruction.

Be it for Americans to apply and profit by lessons such as these.

had been a number of attempts to embody a reliable foot-force. The nature of their country compelled the Swiss to serve on foot as soon as they raised the representative of a national army, and their natural hardihood at once made it formidable. Nevertheless, it was an inert instrument, because, while it was dangerous when opposed to the desultory efforts of opponents relying rather on chivalry than on science, it demonstrated its weakness as soon as it encountered the Three Arms combined, and was plowed and mangled by artillery, as at Marignano, encountered by a fierce, fiery young infantry, and charged when broken by both of these by a brave cuirassed chivalry. The French, from time to time, formed Legions or Regiments of Infantry, whose celerity gave birth to the proverb that "the French were the best marchers in Europe," a quality which may be said to be a national characteristic of these troops down to the present.

Still, all these were not Infantry, except inasmuch as they were Footmen. They bore down opposition by weight, and, formed in huge *Tertias*, ployed masses were unmanageable except on set fields, where it was stand up and take it, and no manœuvring.

As so often before stated, Gustavus Adolphus was the creator of modern infantry. He fought in lines adjustable to any possible ground. His musketeers were taught the skirmish drill, the Tactics of the Three Arms combined and mutually aiding and supporting each other were developed. There had been a new birth of ideas, *la Renaissance*, at the close of the Fifteenth Century, only a very few years previous to the discovery of America. All through the Sixteenth Century humanity was growing up to a more practical and intelligent manhood. An astute government like the Venetian foresaw, at an early date, that if fire-arms were to come into general use, those who were to use them must be practiced in loading, but particularly in taking aim, and enacted laws, accompanied with rewards or bounties, to insure instruction and proficiency in firing. (Compare Warnery's "Thoughts" on this subject, 1774, pp. 153 and 170.)

The same to some extent occurred in France. As soon as fire-arms were introduced corps were organized, not only of Foot, but of Mounted Arquebusiers,—*i.e.*, soldiers armed with arquebuses, the first form of the rude weapon which developed into the musket. Companies of Burgess or civic Arquebusiers were embodied in every French city to replace Cross-bowmen. They comprised, as a rule, the pick of the citizens. Every Sunday they practiced firing at a target or mark. These companies were often called upon by the king to take the field and serve as partisans; they were also employed more legitimately in the defense of cities. Henry IV., by letters patent, 1601–1602, recognized highly the services which had been rendered to him by the Arquebusier companies of Burgesses. Louis XIII. and Louis XIV. conceded to them divers privileges as recompenses for their patriotism.

Their skill, in truth, was often very useful to the country. Among the number of immunities enjoyed by these Companies of Arquebusiers, before the French Revolution of 1791–'93, are cited the following: Whoever on a certain day brought down the bird formerly known as the *Papegai*, or *Papegant* (Popinjay), received the title of King, Emperor, or Grand Master when he carried off the prize offered by the Province. The marksman who knocked off the right wing of the bird or effigy received the title of Chevalier, and of Baron if he shot off the left. When the musket took the place of the arquebuse, the privileges conceded to the latter arm were not entirely rescinded.

In all this, governors and municipalities showed much more wisdom than is displayed in this country to-day. How little is done in comparison of what might, could, and should be done to foster, augment, improve, and support—the last by sympathy and moral backing—our National Guard in large cities and Civic Militia!

It is claimed that Vienna was saved from the Turks in the autumn of 1529 by her Arquebusiers, armed with long arquebuses, weapons perfected in Germany, whose effects terrified even the veteran Janissaries to such a degree that they declared they would rather perish by the sabres or cimetars of their officers than face again the German firearms.

The Elector of Bavaria perceived the wisdom of such instruction, and took similar measures among his own people, so that when they became involved in the maelstrom of the "Thirty Years' War" they produced some of the most efficient infantry which fought on the side of the Roman Catholic League. Nor did the foresight of this bigoted but astute prince fail in effect until a greater and a wiser prince, Gustavus, burst upon Europe with an infantry which united flexibility to solidity, and an army which was an army, "*as* WE *understand it.*" After Gustavus fell a curious problem presents itself for solution, and is insoluble except through hypothesis. Although his successors were his Pupils, and two of them even exceeded him as Great Captains, with a full knowledge of the important results of deployed lines, flexibility, and mobility, they returned to the dense and massive *ployed* formations which Gustavus had demonstrated to be utterly inefficient when opposed to his new system. Why this occurred is the problem. Baner was one of the most sagacious and cunning, withal most courageous, generalissimos who ever tricked or fought an enemy. He was gifted almost, so to speak, with military inspiration. His successor, to whom he bequeathed his army as the only one fit to command it, "the inimitable" Torstenson, was "the modern Hannibal," fully as astute and gifted as Baner, and, moreover, never exceeded, perhaps, in all the qualities of true generalship. Yet he likewise employed the massed formations when he had no men to squander, just as Napoleon delighted in hurling columns into the jaws of flame and death because, as Kléber

said of him, he "was a general at six thousand lives a day," and could afford to be prodigal of lives so lavishly furnished by obsequious Senates and Legislative bodies.

The only solution of the problem is this: It requires a much better class of men for complicated manœuvring and a longer process of instruction than is necessary to fill up a Square, Tertia, or Column, and simply stand or advance in these formations. The troops which were instructed and practiced according to the new system introduced by Gustavus, were soon dissolved by disease or melted in battle. It was next to impossible to replenish the void. The exhaustion of the male population of middle Europe during the "Iron Age" was something terrific, almost incredible, if it had not been attested by reliable eye-witnesses. As soon as men fit to bear arms were caught, weapons were shoved into their hands. They were at once forced into the ranks,—as were our drafted men in the fall of 1864,—and kept there by a discipline which was horrible, and the cruelty of which was only exceeded by the utter savagery with which the *Wehr-stand* (the protecting, but in reality the crushing class) was allowed to retaliate upon the *Nahr-stand* (the nourishing or producing class) and glut all the vilest instincts of bestial human nature upon the innocent and unprotected,—especially women. Whoever has examined engravings of occurrences at this dismal period must have observed that the prominent features in every picture are gibbets and single trees, and pendent from them human figures either freshly strung up or falling to pieces. Callot's series of engravings,—exquisite in execution, however repulsive in subjects,—representing various and successive scenes in military life, would almost seem to be suggestions of the devil were it not well established that they are accurate delineations of what was going on all over what was styled Christian Europe, at this era.

Michelet refers to one contemporaneous picture presenting a common incident which struck him with especial horror. In the foreground a woman of the better class, exhibiting all the effects of suffering and sorrow, is kneeling to a well-fed and richly-dressed officer, who is apparently listening to her with an indifference as absolute as the steel pommel of his sword upon which one of his hands is resting. In the background a number of soldiers are throwing dice for her. There is no need to dilate further upon such a painful subject. The grimmest horror of the whole scene is the matter-of fact air with which the painter has invested it, demonstrating that it was esteemed an occurrence of no especial moment.

(To be continued.)

THE ADVENTURES OF HARRY MARLINE; OR, NOTES FROM AN AMERICAN MIDSHIPMAN'S "LUCKY BAG."

(Continued from page 365.)

CHAPTER VI.

SCENES IN A BREAD-LOCKER; AND HOW TAILORS SOMETIMES GET PAID OFF.

I HAD been on board ship about ten days when orders came for us to proceed to sea; there was animation in every eye at this good news, for all hands were anxious to get to the Mediterranean and away from N——, where we were bored to death by tailors, shoemakers, hatters, and washerwomen. The middies had spent all their advance, and bid fair to pay off their bills with a flying topsail, a method of satisfying one's creditors very common in the navy at that time.

The day before the ship was to sail, the steerage was so crowded with tradesmen with anxious faces that it was impossible to move about with any comfort; and there were numberless inquiries for Mr. Reckless, who it appears had become indebted to the above-mentioned tradesmen to a large amount. That worthy gentleman had gone on the sick list, and had stowed himself away in a small empty bread-room in the cockpit, where, having rigged a table, he was amusing himself playing checkers with a midshipman by the name of Brace, who was also desirous of eluding his creditors. But it is astonishing what noses N—— tailors have for smelling out a midshipman who owes them anything, and Mr. Camphor, in searching about, found himself in the cockpit, where Mr. O'Classics was busily employed writing up "The Plume of the Classics."

"Have you seen Mr. Reckless down here lately, sir?" said the tailor to Mr. O'Classics, in a very polite and fascinating manner.

"To the divil wid Mr. Rickless an' all his crew! No, I niver seen him, an' may the cat fly away wid me but I nivir want to lay me two papers on him agin, onless it be to see him hung, which I'm sure he will be onless he minds his manners. Don't boder me 'bout

Mr. Rickless; I 'av'n't time to be wasting on either Mr. Rickless or his friends."

"I only asked you a civil question, sir, and meant no harm. I am looking for Mr. Reckless to get some money which he owes me; I am afraid he is trying to give me the slip."

"Oh! is it there ye are? an' it's money he's after owin' you? Faith, an' I don't think he has a haporth worth of anything but impertinence; but I can soon ferret him out," said the teacher, "an' it will give me a deal of pleasure to make him fork over. Och, Mr. Rickless, an' is it the poor tailors ye'd be after chating, bad manners to ye? Come this way, my good Tailorman, an' I'll show you the way to his private room, where no doubt you'll find a dozen of them hatching their diviltry thegather."

I had but a short time before gone into the bread-room to apprise Reckless that he was wanted, and that the hawks were about, and as soon as we heard the conversation of the teacher and the tailor, the light was blown out and the door fastened on the inside.

Knock, knock, knock from the cockpit, but no answer from within. "Divil tak' me but he's here, Mr. Tailorman, an' faith we'll have him out, for it's a blessed shame to see a poor thradesman chated clane out of his money in this manner, an' this a free counthry, too; I wonder in what part of the blessed Constitution he finds the authority for his bad manners, bad luck till him. He calls me the mad school-maester, Mr. Tailorman; faith an' I'll show ye how much mad there is about Barney O'Classics in the twinkling of a bed-post. Come out here, I say, you mad divil, Rickless; come out, I say, an' pay yer honest debts, an' don't be for shaming the good name of yer farder and moderer if ye 'av' any. Come out, ye divil's brat, and face yer tailor."

No answer came to this appeal, and Mr. O'Classics proceeded to shake the door, in hopes of breaking it in, but it was too strong for him, and he at length reluctantly gave it up.

"An' is it a poor pine door that ye think will keep Mr. Madtacher from gettin' at ye? Oh, but ye's mistaken; I am not the man to give up that road. Just wait a minit, my good Tailorman, an' I'll nail him up so that he can't get out for a week."

"But that would not do me any good, sir; I want him to get out so that I can get my money from him," said the tailor.

"Don't you know, my good man, that in ould Ireland, when we want to catch a fox we always stop up the hole he goes into, an' then he's always sure to come out?"

"But then, sir, you can take your time watching him, but here time is precious, and I can do more by seeing Mr. Reckless than I can by keeping him locked up."

"Faith, an' may the bats put the candle out, but I never thought av that; that is quite a different affair. So I must go to work and un-

earth the fox, but first and foremost I must nail fast the door, so that the divil can't escape. Whin I was in ould Ireland I was a bit of a carpintir, an' 'av' always taken my tools wid me whirivir I go; at least I'm cock sure I've a hammer an' nails, an' a small saw for boring square holes."

While Mr. O'Classics went in search of his tools, Mr. Camphor was left to look out for the prisoners, and as soon as the Irishman was out of sight the bread-room door was softly opened and Reckless put forth his head.

"Ah, my dear Camphor, how are you?" he exclaimed, "and what do you mean by joining league with that wild Irishman? He'll get you into all kinds of difficulties if you follow his advice, and I assure you I have not the least idea of not paying you. I intend to pay off every cent I owe you this very morning."

"I am really delighted to hear it, Mr. Reckless," said the tailor, who was all bows and smiles. "I thought the gentleman was rather queer when he talked of nailing up the door and fastening a set of gentlemen inside."

"Just get that light, Mr. Camphor, and walk in here and we will settle up in no time; our light has gone out." So handing the light to Reckless from off the cockpit table, Mr. Camphor walked into the bread-room, the door was hauled to behind him, and before he had time to think, a large bread-bag was hauled over his head, his heels were tripped up, and he found himself treated like a prisoner.

"Don't be uneasy, my good fellow," said Brace (who was holding the tailor down while Reckless and myself were tying his legs), "we don't mean to hurt you, but have a desire to take you to the Mediterranean just for the benefit of your health. It is no use to holler down here, for no one can hear you but the mad Irishman, and the first word you utter in the way of complaint you will get your mouth and eyes full of bread-dust."

Poor Mr. Camphor was frightened almost out of his senses, and the idea of going to the Mediterranean for the benefit of his health, shut up in a dark bread-room, was more than the nerves of a ninth part of a man could bear.

"Oh, gentlemen! gentlemen!" he piteously exclaimed, "you can't be in earnest surely, even to keep me here one night, much less play me so foul a trick as to let the ship sail with me fastened up in a bread-locker? What have I done to merit this unkindness at your hands? I only came on board to get my money, and I think this is very shabby treatment after all the credit I have given you; and you, Mr. Reckless, in particular, who have been on our books three years."

"All of which time, sir, I have been paying you ten per cent. interest," said Reckless, interrupting him.

I don't know what the reply of the tailor would have been, but he was interrupted by the voice of the school-master calling for him.

"May the cat ate her kittins but the tailor's flown up the chimbly! an', divil take him, he's carried off the light. I say, my Tailorman, where are ye? Is this one of the divil midshipmate's tricks? Faith, an' I shouldn't wonder if they roast an' ate him afore they're done wid 'im, if they 'av' 'im. May I nivir wear a nightcap but I'll fasten 'em all up, anyhow!" And with that he proceeded to nail up the door, which he did most effectually.

"Now, Mr. Camphor," said Reckless, "you see we are all innocent of this business; it has all been done by the very person with whom you were plotting against us, and if you do go the cruise, it will be through the agency of that madman; for our parts, we have bread enough to live a month on, though we will be rather short of water. We, of course, will divide the biscuit with you, but I am sorry to say you must not count on any of the water in the pitcher, for there is not more than enough for us three."

"But, my good friend, Mr. Reckless, what is the necessity for our staying here prisoners when all you have to do is to cry out and we will soon be relieved?"

"And do you think, Mr. Camphor, that any of this party would cry out for the sake of being let out of prison, after being nailed up by a fellow who has not an idea above a pig and potato? No, sir!" said Reckless, in a decided tone of voice; "and I answer for the whole party, I would stay here and starve to death before I would make one sign of submission to that Paddy. There is but one way I know of, Mr. Camphor, to make me change our resolution, and I don't know exactly about that."

"In the name of heaven, gentlemen, what way is there to get out of this? I am sure I will do anything to assist you."

"Well, that is getting to be reasonable, Mr. Camphor; but you must swear to agree to all we ask, and to assist us in all our endeavors to get out."

"Oh, anything, anything! I swear to do anything rather than stay here all night and run the risk of sailing with the ship to-morrow."

"Well, then, sir, *our* proposition is this: you are first to sign a paper releasing me from payment for three years to come, and to accept a draft from me on the Sandy Hook Sand Bank in full of all demands. I don't intend that you shall lose anything by me, I only desire to defer payment, allowing you to charge your ten per cent. as usual. Are you agreed to that, Mr. Camphor?"

"I suppose I must, Mr. Reckless, though the times are rather hard; but never mind so that I get out of this."

"Hold on, my good friend, you have not heard all the terms: we expect you to advance us enough to pay for a good oyster supper to-

night, provided we can get on shore; and now write down on the back of the bill the acquittance you have agreed to."

Camphor fairly groaned at such terms, but it was no use to object, so he signified his assent.

"And now, Mr. Camphor, we will get you out of this, provided you assist us in punishing the mad school-master, for we must serve him out for all this nailing up."

"I will do anything, Mr. Reckless, only let me out; and if ever you catch me chasing midshipmen into the bread-locker again, may I forfeit my character——"

"As the ninth part of a man," added Brace.

Everything being settled according to agreement, Mr. Camphor was let out of the bag and the papers signed.

"And now," said the fertile Reckless, "let us think what is to be done; we must first get out and manage somehow to get the Irishman in, and I promise him he shall have less for supper for two days than he got the first night he came on board. Now, gentlemen, follow my motions."

Reckless commenced pounding and kicking at the door, in which all of us joined, and no one more heartily than the tailor.

"Ah! are ye ther', me spalpeens? Faith an' I thought ye'd all flown up the chimbly. Kick away, my horses, but little oats will ye get from me."

"Let us out, Mr. O'Classics, we are suffocating, one of us have fainted already."

"Och! divil a bit onything could sufficate one av ye; ye could brathe brimstone an' it would not hurt ye," he replied: "the devil always takes care av his own."

"I assure you, Mr. O'Classics, that Mr. Marline has fainted, and the poor tailor is at his last gasp."

"Och! are ye there, my poor Tailorman? An' 'av' the divils got you in their clutches? Faith, but I pity ye. I'll give ye fresh air, my boys, but a very small portion I assure you."

We heard something at length boring into the door, and presently a boring-bit came through on our side, then it was withdrawn and came through at another point, until finally he bored a complete circle about the size of a man's head, and then proceeded to cut it out with a circular saw.

"That's capital," said Reckless. "We must get him to look through the hole by some cajolery, and then, Brace, you and I must seize him by the hair of his head and hold him there, and the first thing we must do is to commence groaning in a feeble voice, and make believe we are dying. Brace and myself will stand on each side of the hole and seize him when he puts his head through, which I am sure he will do the moment he finds we are silent."

The saw had gone nearly round the circle, when the teacher knocked it in with his fist: "There's a brathing-hole for ye, me fine fellows. Faith an' ye'd be glad to see the carcase of that summer goose coming through, wouldn't ye? Arrah! an' it's but little goose ye'll get from Barney O'Classics. Yer silent, ar' ye? an' will ye may be, ye ill-favored loons, after all yer cantankerin', but ye'll spake fast enough afore I draw a nail for ye's. I say, me good tailor, how do ye fare in that divil's den? You'll be lucky if ye are not atin an' roasted afore ye get out; an' but for you, may I nivir hear the piper agin if I'd give them a mouthful of fresh air. Oh, ye ar' all a-gruntin' ar' ye, like pigs as ye are? an' maybe ye ar' sick, an' I'll take a look in and see how yer doin'." And with that he commenced working his head through the hole, which was not any too large for it. His chin had no sooner crossed the lower part of the hole than he was seized on both sides by the two midshipmen, and held as firmly as if he had been in a vise.

"Let me go, ye tundering villains!" he screamed. "An' is it me that's caught in me own trap? May yer teeth drap out, ye villain Rickless, yer pulling my hair out by the roots! Och! but I'll murther every mother's son av ye when I get my ten fingers on ye. An' is it ye, my fine tailor, that was prethending ye were dead? But may the cat fly away wid me an' I'll make ye swallow yer own goose hot, an' shave yer eyebrows off wid yer own shears! I will, I will!"

"A good idea, Mr. Camphor," shouted Reckless. "Get out your shears and be beforehand with him. Hold him tight, Brace, while he does it *secundum artem*. There's Latin for you, Mr. School-master. *Multum in parvo*, which means a big head in a small hole, Mr. O'Classics. And now we are going to give you a *quid pro quo*, which means a good lathering with this paint-brush, and cut off your hair *seriatim*, which means after we have shaved off your eyebrows; and, moreover, *cæteris paribus*, which means when we have clipped you into something like ship-shape; *quantum sufficit*, which means until you look a little decent; *ne plus ultra*, which means when we can do nothing more to you we will place you in *statu quo*, which means let your head out of that hole; *penxit*, which means beautifully illustrated, *pro bono publico*, for the admiration of the whole ship's company. Now, Mr. O'Classics, there's Latin for you to chew, and take the advice of a friend and submit to your fate like a good Paddy. Marline, give him a potato to keep his courage up."

"Do it if ye dar, ye ill-born imp! I scorn yer Latin as I scorn ye all. An' ye vile tailor, for every hair ye clip from me I'll make yer life *tedium vitæ* to you, which, according to younder villain's translation, manes to break ivery bone in yer body."

"Do your duty, Mr. Camphor, *tempus fugit*, which means we have no time to lose." And the timid tailor marched up, and with one clip took off the starboard eyebrow.

"Well done, old Camphor! Off with the other one, and get him on even keel; he has a heavy list to port." And off went the other, amid the shouts of the party,—except the tailor, who was too frightened to laugh.

"An' there's a broken leg for ivry eyebraw ye cut off, ye robbers; an' while yer at it ye might as will cut off the rist av them. Och! ye scoundrils, ye'll rue the day whin I get hauld av ye. Cut away! cut away! Barney O'Classics can live widout hair."

"You hear what he says, Mr. Camphor?" said Brace. "Now let's trim him like they do the fellows in the penitentiary. Go to work and shave the starboard side of his head, and his beard is not cut according to the regulations anyhow. Don't be frightened, Pat, we won't hurt you; we are only going to treat you as you would treat us, if you could. Go ahead, Camphor, or you will never get out of this." And with that the tailor went to work with his shears, and soon cut away the starboard side of the school-master's hair, and then made an attack on his whiskers. While performing this delicate operation, Mr. Camphor approached his hand rather too near the Irishman's mouth, and before he knew what was coming he found his forefinger suddenly seized in Mr. O'Classics' teeth, and held there as if it was in a vise. The pain was so great that he dropped the shears in a minute, and sung out "Murder!" "fire!" "thieves!" and then fell to awful cursing and swearing, which astonished us all very much, knowing him to be a strict member of the Church.

Reckless and Brace pulled away at the teacher's hair in hopes of releasing the tailor, but it was no use, for the more they pulled the harder he bit, and the tailor was near fainting with pain when he was rescued by a party we little desired to see.

It appeared afterwards that the captain had appointed the day before the ship sailed for the commodore of the station to inspect her. They had gone their rounds, and were about going on deck again when the smothered cry of murder met their ears. In a moment the whole party descended into the cockpit, when they were astonished at the sight of some one with his head through the door of the bread-room, and his arms and legs flying about like a jumping-Jack's, for just at that moment I was painting his face with some red lead which had been left in the bread-room, and he was making violent struggles to get away. The cries of murder still went on, and even the school-master began to bellow like a bull.

I could hear the captain's voice amid all the din singing out, "What in the name of heaven is all this, Barnacle? Here's a murder committed! Bless my soul if Mr. O'Classics has not committed suicide! Poor fellow, poor fellow! such an elegant scholar as he was."

"He is not dead, sir, that's very certain, as his arms and legs testify. He is as mad as a March hare, and is always running his head into

difficulty, and I should not be surprised if he has run it through the door."

"Och, but thir murthering me outright!" yelled the teacher in agonized tones. "May the cat fly away wid 'em for a sit of divil's midshipmates!"

"Have him got out somehow or other, Mr. Barnacle; we may save him yet," said the captain. And Mr. Barnacle, who did not seem to care whether he was dead or alive, coolly proceeded to call some men to release the teacher from his perilous condition. Four sailors came down, and seizing him by the body, they went to work to haul him out "by main strength and nonsense," as they say in the navy, and at last succeeded in landing him on the deck more dead than alive. Such a spectacle as he presented, with his face painted red, his eyebrows cut off, his hair shaved close to his head, and his whiskers horribly mutilated, no one ever saw. The doctor was sent for immediately, and everything was done to restore the poor fellow to his senses. In the mean time the most piteous moans came from the bread-room,—the poor tailor still suffering perfect agony from his finger, which had nearly been bitten off.

"There is something wrong inside the bread-room, Mr. Barnacle," said the captain. "Have the door opened and see what it is. Make haste, sir, some one may be dying." But the door being nailed it was found necessary to send for the carpenter to open it.

"This is the most inexplicable circumstance I have ever met with," said the captain. "Here I am showing the commodore around the ship, my ears are startled by the cry of murder. I rush down into the cockpit, find the schoolmaster has run his head through a plank in the bread-room door, and has died in an attempt to commit suicide; I have him hauled out, find him stone dead, his head clean shaved, his eyebrows pulled out by the roots, and body covered with blood. Why, sir, the Newgate calendar never contained anything to compare to it. It's worse than arson or breach of promise, both of which I look upon as horrible. Are there any deep gashes about him, doctor? I expect you will find the cuts in the region of the heart."

"He is not dead, sir," said the surgeon; "only a little faint. Neither is this blood, sir; it is only red lead which some one has been smearing his face with. Don't be uneasy, sir, he is coming to now. Some one has been playing him rather a practical joke, and judging from the nails in this door and those implements (pointing to the hammer and saw), some one is locked up inside who, by their moaning, may require more assistance than this gentleman."

By this time the carpenter had arrived and proceeded to break open the door, and there stood revealed the persons of the inside party looking as innocent as white mice; the tailor did not wait to be questioned, but, to the astonishment of every one, bolted up the hatch and over the

ship's side before any one could stop him, and that was the last we ever saw of Camphor, the tailor. I am told that he has never put his foot on board a ship of war since that time.

"What in the name of heaven does all this mean, gentlemen?" said the captain. "Come out of that, sirs, and explain the mystery at once. Oh, you're there, Mr. Reckless! well, that accounts for half of it at once. Speak out, sir, immediately, and explain this mystery."

"No, Captain Marvellous," said Reckless, who pretended to have his feelings much hurt, "I must leave Mr. Brace to explain, for you always consider me in the wrong; and in this instance you will find me a much wronged and injured individual."

"Well, then, Mr. Brace, give us your version of the affair, and remember, sir, to tell the truth and nothing but the truth, for there is nothing I so much dislike as prevarication of any kind."

"The facts are these, Captain Marvellous," said Brace: "being rather a cool day, Mr. Reckless and myself thought we would try and warm ourselves in the bread-room, as we both had chills this morning. Mr. Camphor, the tailor, came on board to take our measure for a vest apiece, and invite us to an oyster supper this evening, so we sent for him to come down in the bread-room. He had no sooner entered the room than the door was closed behind him, and some one on the outside commenced nailing it up, and as we were almost suffocated for want of fresh air, we commenced begging the party, whoever it was, on the outside to let us out. In answer to our appeal we heard Mr. O'Classics in the cockpit laughing at us, and he threatened to suffocate us all, and called us the most horrible names in Irish you can possibly conceive. After a while he condescended to cut that hole in the door, and then put his head through to laugh at us, and there he stayed talking nothing but Latin to us for twenty minutes or more, and finally told us in his brogue that officers in the navy were all ignoramuses, because we did not comprehend his Irish Latin. He had a great deal of trouble to get his head in the hole, and after being there so long his head must have swollen, for he could not get it out again. He called on us to help him, but fearing he wanted to play some tricks upon us we refused to go near him. Mr. Camphor, who is a good-hearted man, feeling a pity for him, undertook to help him get his head out, but the ungrateful wretch seized him by the finger while he was doing him an act of kindness, and held him there as if he had been in a vise; that is exactly what he wished to do with one of us, for what reason I do not know, for we have always treated him with the most profound respect! Finding that Mr. Camphor was nearly fainting with the pain, we endeavored to pry Mr. O'Classics' mouth open with the only thing we could find, which was a red paint-brush, but without effect, and Mr. Camphor, out of revenge, cut off his eyebrows, hair, and whiskers, in hopes that would make him let go his hold. I am perfectly satisfied, sir, that he intended to murder us all,

and I am as well convinced as I ever was of anything in my life that he is crazy."

"I knew it was one of that mad school-master's pranks, Captain Marvellous," said the first luff, "and it will end in his doing them some injury yet; for a man who could shut up three persons in a bread-room for the purpose of suffocating them would be guilty of any act."

"*Suav-i-ter in Modo, For-ti-ter in Re*, an' that's what I am," said the school-master, slowly settling himself on end; "but if ye say I'm mad, or crazy, ye *Lu-sus Natu-ræ*, wid dat tundering wart on yer nose, yer guilty of a *Lap-sus Lin-guæ*, which manes, accordin' to the translation of that divil's imp, Rickless, that yer telling now a most tunderin' lie."

"Mr. O'Classics! Mr. O'Classics! do my ears deceive me?" said Captain Marvellous. "Can it be possible that it can be you talking in that way to the first lieutenant of my ship? Silence, sir, immediately, and don't let me hear you speak another word of that kind, or I will prefer charges against you, and have you dismissed the service."

"Oh! to the divil wid your sarvice! May old Satan himself take me av this is the kind of sarvice you do a man! May my bag-pipes burst but I want none av it! Faith, doctor, yer the only gintilman prisint, for ye did go flotherin' about me when ye thought me was dyin'; but divil a bit is Barney going to die till he gets his rivenge out av the United States navy. And, look here, Captain Marvellous, they may will call ye Tom Pipper, who was kicked out av hell for lying, for av yer not lying yersel', yer aidin' an' abettin' others to lie, an' I don't care a snap of a copper for ony av ye. As to your fast lieutenant, wid a wort on his nose, the divil will only get his own when he haves his net over him, for he's a bigger scoundrel than that divil's son, Rickless, who I 'av' promised to brak ivry bone in his body whiniver I git my tin fingers ontill him."

"The Lord have mercy on the poor man's soul," said the captain; "he is crazy as a March hare. What do you think it is best to do with him, Mr. Barnacle? He may get over this in a few days, and I don't want to lose him, for he is an elegant scholar. Didn't you hear him quoting Latin just now?"

"Yes, sir," said Mr. Barnacle (whose wart was as large about this time as a good-sized strawberry), "I heard him speaking Latin, and I think the best thing to be done with the gentleman until he comes to his senses is to put him in the bread-locker, and see if he won't cool off. He can quote Latin there to his heart's content and learn what is due to his superiors. I do not think it safe at present to let him go at large."

"If yer goin' to lock me up on the ground av being *non compos mentis*, yer much mistaken, auld blanderbuss. I'd like to see the man that'll touch me." And with that he seized the saw which lay near

the door, and, jumping to his feet, put himself in an attitude of defense. Mr. Barnacle made some sign to the four sailors who were standing in the cockpit waiting orders, and in the twinkling of a tea-pot—to use one of Mr. O'Classics' metaphors—he was down on the deck again and tied hand and foot, the bread-room door was opened to receive him, and then, by orders of Mr. Barnacle, nailed up so securely that he could not open it from the inside.

"Poor man!" said the captain; "what a pity it is to see so brilliant an intellect clouded with insanity! I am afraid we will have to part with him, Mr. Barnacle, for he is really dangerous. And now, gentlemen," he said, turning to the midshipmen, "see the evil effects of going into the bread-room instead of keeping to your own apartments. If you had not gone there this would not have happened; but at the same time I am glad that none of you were in the wrong, and I hope you never may be." And turning round, he proceeded up the cockpit ladder.

Just at this moment the school-master, who had got his legs loose, put his head to the hole in the door, and a most ludicrous-looking object he was. "One ward wid ye, Captain Marvellous, 'fore ye go," he said, and the captain stopped half-way on the ladder. "All I 'av' to say to ye is this: I belave what the warld say av ye,—that ye tould so many lies about a harse ye said ye bought (a full-blood Arab), that ye actally belaved it yerself, and bought a saddle an' bridle for the baste. An' that's as near the truth as ye can come. For shame on ye, ye wizen-faced divil; and that's what I call *utile cum dulce*, which means spaking the truth to ye, so that ye may mind yer manners."

"Poor man, what an intellect is there ruined!" said the captain. "Treat him kindly, Mr. Barnacle. Give him nothing but bread and water for a few days, and put him in a strait-jacket and double irons if he gets the least outrageous." So the school-master was left to his own reflections, and the midshipmen had such a laugh over the frolic that the first lieutenant had to threaten to send them all to the mast-head if they did not make less noise.

(To be continued.)

THE FRENCH CONFLICT IN NORTH AFRICA.[1]

THE 27th of April, 1827, was an eventful day in the history of North Africa, for then was laid the foundation for the contest which the French are now waging in Algeria and Tunis.

On that day Hussein, the last Dey of Algeria, gave a formal audience to foreign magnates. He addressed Duval, the French consul, in a most contemptuous manner; the latter was then playing the same rôle that Consul Roustan is now playing in Tunis.

"Hast thou," asked Hussein, "a letter for me from thy master?"

"Your highness very well knows," replied the fiery Frenchman, "that the king of France does not exchange letters with the Dey of Algeria."

The Dey broke out into a storm of abuse at this haughty answer, including in it even the French monarch, and ended by slapping the consul in the face with a fan of peacock's feathers, which he carried to drive off flies. This was the first cause of the war that followed between France and Algeria. Two years afterwards the French had gained a firm footing on the Algerian coast. Hussein surrendered his capital to General de Bourmont, the French commander, on the 5th of July, 1830. Thus, this land of robbers, that hitherto had carried on a merciless war against Christian nations, fell, with the consent of Europe, into the possession of France. This conquest ended the traffic in Christian slaves,—the disgraceful tribute paid by Europe to the Barbary States,—and released the captives from their long suffering under despotic masters. The French commander set his troops in motion at 11 A.M., preparatory to his triumphal entry into the conquered city. Gayly they advanced towards the town, preceded by martial music and the clatter of drums, little expecting the horrible spectacle that awaited them. As the victorious column approached the gates, the citizens, with herculean efforts, filled the moat that surrounded the city with the mutilated bodies of all the Frenchmen who had been captured during the siege. Headless bodies, pierced with bullets, corpses which had been subjected to every indignity, were displayed before them. This was the prelude to the atrocities afterwards perpetrated on both sides,

[1] Translated from the German by Lieutenant J. J. O'Connell, U.S.A.

and which have been continued with more or less virulence to the present day. This war exceeded in ferocity the most disgraceful scenes in European warfare. The natural cruelty and barbarous tactics of the natives give it this character.

They seldom take prisoners, and when they do, it is to deliver them up to the greater cruelty of their women and children, who torture them to death; hence it is that a Frenchman would rather die than be taken prisoner. Guard and outpost duty are attended with innumerable dangers and difficulties. The Arab is quick to take advantage of every secret path and every possible opportunity, and does so with an ingenuity of which a redskin might be proud. The French, when on the march, usually arrange their camp in the form of a square. In front of the centre of the sides are stationed advanced posts, between each of these are established other posts at short intervals, so that the camp is surrounded by a complete cordon of sentinels. Every day at dusk the companies stack arms. These stacks are guarded by sentinels, who are hourly relieved, yet, despite the most stringent orders and wise precautions, the Arab sometimes finds his way into the camp to steal arms and horses, or murder some sleeping soldier. This difficult feat is accomplished through a most ingenious device. They wind around their bodies a mixture composed of mud and branches of trees, then approach the camp in the guise of a bush, and, by imperceptible degrees, effect an entrance. Often when the corporal of the guard arrives at a post with the relief he finds the sentinel already relieved and headless; probably a young soldier who had lain down for a moment, overcome by sleep and the fatigue of a long march. The old soldier, who knows the country well and the ways of the inhabitants, is not apt to be thus caught napping. He closely scrutinizes the vicinity of his post, carefully counts the number of trees and bushes near him, watches sharply that they are not suddenly increased and that they keep at a respectable distance from him. The little column marches slowly and steadily along through this strange country, hampered by a large train, and continually harassed night and day by dangers of this kind. The natives know so well how to conceal themselves that they can deceive the most practiced eye, and they are ever on the alert, and never let an opportunity pass of inflicting some injury on their enemies. This African warfare is a severe school for the French soldier. The very best troops will finally succumb to the hardships and privations incidental to marches of from ten to twelve hours in duration, performed under a broiling sun and in waterless wastes. The soldier, burdened with a heavy knapsack, plods silently and wearily onward through trackless sandy plains, where his bloodshot eyes vainly search for some object to break the monotony and deathly stillness of this vast expanse, where not even a shrub meets his eye, where the sun's rays strike him vertically and the heated sand

gives them back with increased fervor, as though the air was a blast from a glowing furnace, where not a drop of water is to be found to moisten his parched lips. Suddenly he spies, far away on the horizon, a bright silver lake, shadowed by stately palms. With this pleasant prospect before him he takes fresh courage, lengthens his step, quickens his pace, and forgets for the moment all his miseries in the blissful anticipation of a refreshing draught. How terrible his disappointment when, after many efforts to reach the object of his longing, he finds that the beautiful lake recedes in proportion to his advance until it vanishes altogether, and he is the victim of a Fata Morgana! The French have not only to contend with arid plains, but likewise with steep and rugged mountains. During the first campaign against the Bey of Tetri their line of march lay through a pass called the "Iron Gate" of the Atlas Mountains. The country through which the army passed towards the mountains was desolate and waste. The Kabyles had abandoned their dwellings. Only here and there a woman was to be seen, in her wild beauty, with flashing eyes, rounded form, supple and elastic as a tigress. Men were seen with long guns moving on the summit of distant hills, who, in their white head-gear, reminded one of ghosts. General Clousal's army wound among the precipitous mountain defiles, glittering like a huge serpent in the sun. The victory of Moussa Pass cost the French dearly. It was here that the wild, independent mountaineers first learned the nature of a cannon, which they called Mochala-el-Keber, or the big gun, and they have ever since regarded it as an object of terror. Before they understood the destructive effects of grape they looked upon the "big gun" with the greatest curiosity, until the moment of explosion, when they became cognizant of the result. These combats were conducted with uncommon ferocity. The wholesale slaughter of captives by musketry was the order of the day for a long time on both sides.

Marabouts traveled about from village to village of the nomads, spurring them to deeds of blood and exciting their religious fanaticism against the Christian dogs. The Arabs, Moors, Berbers, and Kabyles were by this agency kept in a high state of warlike and religious excitement. Beheading their prisoners was systematically practiced by them. The Algerian tribes reached the acme of their power between the years 1835 and 1839, during which period they were commanded by the celebrated Emir Abd-el-Kader. The greater part of the provinces of Oran and Algeria, with the exception of a few coast towns, was subject to his sway. He gained his greatest victory over the French on the 26th of June, 1835, at La Macta, where, by a masterly onslaught, he annihilated their army under General Trézel. All the cannon, ammunition, and train fell into the hands of the victors, who pursued the scanty remnant of the French to the very gates of Mustagana. From this event to 1839 the Emir's power steadily advanced, attaining its

zenith in that year. After this it continued stationary for a short time, then began quickly to decline, until finally extinguished. The famous chieftain was taken prisoner by Lamoricière in 1847, after which he spent the rest of his days in captivity at Brussa and Damascus, on a pension of one hundred thousand francs per annum, a tenth of which he never before possessed even when at the height of his prosperity. He employed his latter days in scholarly pursuits. But what was his altered condition in comparison with his former life, when, in the fullness of his liberty and power, he was monarch of the vast Sahara, and ruled with absolute sway over two million Arabs! His defense was long, able, and obstinate, and, although not very choice in his method of conducting hostilities, when captured he was treated with magnanimity. There are dark spots, however, on the pages of the history of this epoch. North of Orleansville are situated the precipitous Draha Mountains, the scene of the famous defense made by Bu Masah, a religious fanatic and leader of many warlike tribes, which defense was brought to an inglorious termination by Pélissier, afterwards Duke of Malakoff. Bu Masah established his headquarters in the rocky fastnesses of Masunah, whence he sallied forth *ad libitum* into the valley of Schileff, where he fought his enemies under Marshal Saint-Arnaud, Pélissier, and Lamoricière. The contest was unequal. This irregular body of freebooters could not long stand against French regulars, so that the insurrection of Bu Masah was brought to a speedy conclusion. There was one band, however, that still held out, that of Beni Ramah, whose heroic resistance and love of liberty challenge the admiration of posterity. This band, after the destruction of their comrades, was hotly pursued by Pélissier, and what neither arms nor diplomacy could achieve—that is, their subjugation or annihilation—was effected by the most terrible of all natural agencies,—fire. Truly, the peace to which this element reduced Beni Ramah was the silent peace of the grave-yard. He retreated to the caves of Freschuh, in the lonely, rocky, and wildly romantic vicinity of the Draha Mountains. His whole tribe, numbering some thousands, with women and children and domestic animals, found there a secure place of refuge. From this iron-bound fortress he waged war, causing great havoc among the French, until Pélissier, after having in vain tried all other means to dislodge him, finally resorted to the method of smoking him out. He forgot that he had to do with a fanatical and unrelenting foe, who preferred death in any form rather than to surrender to the hated Christian dogs. He caused wood and straw to be brought to the mouth of the cave, in which was collected the tribe and its cattle. He ordered the straw lighted. The smoke soon filled the recesses of the cavern. But a few minutes elapsed when the roaring of animals was heard, the groaning of men, the wailing of women, and the heart-rending cries of suffocating children. In the midst of this atrocious scene was heard a volley from within.

Then all was silent. The silence of death reigned in the Cave of Freschuh. Horrible was the sight that presented itself next morning to the gaze of the engineer company that entered the cave. At the entrance lay two half-roasted steers, and near by the corpse of a mother, whom death attacked while in the act of defending her child from a third steer, for she still held the horns of the animal fast with both hands. The most ghastly scenes were presented on every side. The body of the venerable sheik of the tribe was found lying under the carcass of his own horse. Two lovers met their hard fate in each other's arms. The unspeakable suffering produced on the faces of the victims an expression of ferocity and pain, which death stamped indelibly on their features. Horses and men, women and lambs, children and goats, weapons and ornaments, lay strewn around in indiscriminate confusion on the smoke-blackened floor. In this way the tribe of Beni Ramah breathed forth its heroic spirit. We will not here omit to add that the French Chambers strongly condemned this barbaric act, but Pélissier found in the army his defender. The French fight to-day in Tunis as they formerly fought in Algeria. The warfare is similar. We again hear of fire and murder and cruelties of every description, and we would not be surprised to hear of acts as above described. The lives and customs of the Arabs and Berbers have changed but little since 1830, when the French first landed on their shores. History repeats itself. Tunis is the parallel of Algeria. The methods of warfare then in use are apt to be repeated now, and hence this attempt to refresh the memory of our readers.

THE NATIONAL DEFENSES OF ENGLAND.[1]

It has been the practice of my predecessors in the chair I have now the honor to occupy, to select topics for their address that have reference to branches of engineering which operate to increase the productiveness of human industry, and there are many who will contend that all engineering efforts ought to centre upon that object. It may be fully admitted that the general amelioration of the material condition of the world is the noblest object of our science; and if men and nations ceased to be bellicose and rapacious, such would naturally be the direction which all engineering practice would take; but we live in a world of contention, where no individual state can insure its independence, and carry on its industrial occupations in safety, without protecting itself against the possible aggression of its neighbors. Thus it is that the science of the engineer is invoked for the purposes of war as well as for those of peace; and it is probable that the engineering element will in future enter more and more largely into the operations of war, until the issue will be chiefly dependent upon the superiority of mechanical resource displayed by one or other of the contending parties.

There is no country in the world less disposed to be aggressive than our own, but there is none so likely to incite the greed of an assailant, or so vulnerable in relation to its commerce. War indemnities have degenerated into mere exactions proportioned to the wealth of the vanquished; and England, being the richest of nations, offers the highest premium for successful attack. As to commerce, we have more than half the ocean carrying trade of the whole world in our hands, and our ships, swarming over every sea and conveying merchandise of enormous value, would, in the event of war, invite the depredations of hostile cruisers. We have seen in recent years what ravages a single armed ship can inflict upon a mercantile navy incomparably smaller than our own, and in our case it is not only property, but indispensable food that is at stake. The ever-increasing population of Great Britain has already far outgrown its internal means of support, while the increasing cheapness of imported food so discourages native agriculture,

[1] An address delivered by Sir W. Armstrong, on his taking the chair as President of the Institution of Civil Engineers, on January 10, 1882. Reprinted from *Colburn's Magazine.*

that we may expect our future dependence upon foreign supply to increase even more rapidly than our population. This is not the occasion to discuss either moral questions affecting war, or political questions concerning free trade. We have the stern fact before us that national defense is in our case peculiarly a necessity, and the question how it can best be effected, from an engineer's point of view, is a legitimate subject for this address.

England must always be chiefly dependent for security upon her naval power, but we cannot hope that she will ever again be so dominant at sea as before the introduction of steam navigation. So long as naval superiority depended upon seamanship and an unlimited supply of sailors, no nation or combination of nations could compete with us; but as soon as it became established that fighting-ships could be manœuvred with more certainty and precision by the power of steam than by the power of wind, a revolution began which has gradually made naval warfare a matter of engineering rather than of seamanship. The introduction of rifled ordnance and percussion shells was the second step in this revolution, and had the effect of condemning as useless the whole fleet of wooden ships with which all our victories had been won, and which were the pride of the nation. Then commenced that contest between guns and armor which has gone on to this day, and has not yet been decided. Nor will it in all probability ever be decided, seeing what an *ignis-fatuus* finality is.

The most recent stage of this revolution is that marked by the introduction of torpedoes, against which our ponderous ironclads are no more secure than ships of thinnest iron. These constantly-changing phases of attack and defense have placed our naval authorities under extreme difficulty in deciding upon questions of ships and armament. To stand still was impossible, while to act upon uncertain data was sure to lead to mistake. The necessary consequence has been that types and patterns of ships have been continually changing, and vessels costing vast sums of money have become nearly obsolete almost as soon as made.

We cannot wonder that so long as invulnerability was conceived to be attainable, great sacrifice should be made for its accomplishment; but with our present knowledge, which it would be unfair to apply to a criticism of the past, we may feel assured that invulnerability is a chimera. Not only do we see that armor is unavailing against torpedo attack and ramming, but we are justified in concluding that every attempt to increase resistance to projectiles will be quickly followed by a corresponding increase in the power of artillery.

Our early ironclads, like the "Warrior," were plated all over with armor of four and a half inches thick,—a thickness which could now be pierced with field-pieces. To resist the most powerful guns now afloat, armor of at least two feet in thickness is required; and in order to reconcile the constantly-increasing thickness with the weight which

the ship is capable of carrying, it has been necessary to restrict the area of armor surface to ever-narrowing limits, leaving a large portion of the ship without protection.

In those magnificent and tremendous vessels which the Italians are now building, the armor will be withdrawn from every part except the battery, where guns of one hundred tons will be placed, and where the armor will be confined to a narrow belt of great thickness. Everything of importance that projectiles can destroy will be kept below water-level, and so far as artillery fire is concerned, the ships will be secured against sinking by means of an under-water deck and ample division into compartments. Armor therefore seems gradually contracting to the vanishing point; but until it actually disappear, it is probable that no better application of it can be made than has been decided upon by the acute and enterprising naval authorities of Italy for the great ships they are now constructing.

The quality of armor plates has of late been greatly improved by making the outward side hard and the inner side soft. By this means a steel facing may be used without that great liability to fracture which previously disqualified steel as a material for armor plates. This improvement will probably give fresh encouragement to those who advocate the continued use of armor; but even if the victory of armor over guns should ever be established, it would be still a question whether it would be worth while to incur the enormous expense incident to the use of armor for the one advantage of resisting projectiles, seeing that, however invulnerable by shot a ship may be rendered, it must remain equally assailable by rams and torpedoes, and equally liable to be lost by casualties other than those of war.

The dread of the terrible effects of the fragments of shells bursting amidst a crowded crew, and the apprehension that the smoke from the explosion when it occurred between decks would paralyze the service of the guns, have conduced more than anything else to the adoption of armor. Methods of avoiding or lessening these dangers otherwise than by the use of armor have been little considered; yet the alarming aspect of the case is greatly altered when we reflect that by the application of mechanical power to do what has hitherto been done by a multitude of hands, the exposure of a crowded crew can be avoided, and also that the guns may all be mounted on an open deck, where the smoke from shell would speedily clear away.

It is a recognized fact that the function of armor may in a very considerable degree be fulfilled by the coal, if judiciously applied for that purpose. The resistance of coal to the penetration of shot is very remarkable. By experiments made last year at Shoeburyness, it was found that with a 6-inch new type gun, capable of piercing an iron plate of ten and a half inches thick, a resistance equal to that of the armor was offered by eighteen feet of coal; and that with an 8-inch

gun of the same type, capable of piercing thirteen and a half inches of similar armor, an equivalent resistance was obtained with twenty-six and a half feet of coal. The deadening effect of coal upon the explosion of shells is still more remarkable. The committee under whose direction the experiments were made, reported that the bursting of common shells had no igniting effect upon the coal, and little or no disruptive effect upon the structure containing it. As to the destructive effect of shells upon a crew in a ship where no protection of any kind is used, I venture to think that the reality would fall much short of the anticipation. Percussion shells do not burst instantaneously on striking, but travel about six or eight feet after free penetration before they explode. The fragments then begin to disperse, but retaining the forward motion of the shell, while deflected by the action of the bursting charge, they form a cone of dispersion, the angle of which is determined by the relation between the forward and lateral velocities of the pieces. It is only within this cone that the disrupted shell can do any harm; and as the shell will generally enter on the fighting side of the ship where the men would be placed, the fragments would there cover a very small area, and would only attain their maximum dispersion at the opposite or unoccupied side. This would not be true of a shell entering in a raking direction, but it is a principal object of manœuvring to avoid exposure to a raking fire. An absolutely unprotected ship would probably suffer more from machine-guns than from shell fire; but there would be comparatively little objection to making the skin of the ship, at the gun-deck, sufficiently thick to resist missiles which can be discharged in showers from those weapons.

As to the comparative liability of an ironclad and an unarmored ship to be sunk by projectiles, there is much less difference between them than is generally supposed; because the unarmored ship, though freely penetrable, may be so constructed that the entrance of water by perforation would not extensively flood the ship, unless it took place at a greater number of critical places. Indeed, by introducing an underwater deck, with divisional spaces, and by the partial application of cork, as in the "Inflexible," for displacing influent water, and thereby preserving stability, and also by a proper distribution of coal for the same purpose, an unarmored ship may be rendered almost incapable of being sunk; and it is rather surprising that so little attention has been directed to the attainment of that object.

It is not too much to say that for the cost of one ironclad we could have three unarmored ships of far higher speed, and carrying collectively three armaments, each equal to that of the armored vessel. We may ask, Which would be the better investment? If we imagine the three to be matched in combat against the one, we perceive that, in addition to their numerical superiority, they would possess many advantages. Being smaller, they would be more difficult to hit. Being

swifter, they could choose their positions, and be free to attack or retreat at pleasure. Being more nimble in turning, they would be better adapted for ramming and for evading the ram of their adversary. Finally, the conditions of superior speed and agility would favor their use of torpedoes and submarine projectiles; although it is a question whether, for the sake of a much-needed simplification, it would not be better to confine that species of attack to separate vessels specially constructed for that one particular purpose. Even if we concede to the ironclad the utmost advantage she could possess,—viz., that of being impenetrable by guns of her opponents,—she could not prevail in a contest of three against one, unless, by the use of her securely-protected artillery, she could keep her assailants at bay, and gradually destroy them by her fire if they persisted in their attack. Such might be the issue if the allied vessels had nothing but guns to oppose to guns; but they would naturally, under such circumstances, place their men below, out of the reach of projectiles, and then attack with their rams or torpedoes. With the crews in safety, it is scarcely possible that unarmored vessels, with under-water decks and all their machinery beneath, should suffer any disabling injury by being pierced in a few places by either shot or shell. But let us take the much more probable alternative of the armored vessel being penetrable by the guns which would be used against her. In that case her enemies might elect to make the contest one of artillery. On their part, armor-piercing projectiles would be used which, on penetrating the thick sides of the ironclad, would carry inboard a mass of broken material far larger in quantity than the fragments of the shells with which they would be assailed, and quite as destructive in effect. The ironclad would have to sustain the converging fire of three ships, each carrying the same armament as her own, and her swift and nimble adversaries would steam round and round her, directing their fire on the most vulnerable points, and ever ready to seize a favorable moment to dash in and finish the contest by ramming. In either case, therefore, the ironclad would be overmatched by a combination of unarmored vessels representing the same pecuniary value. Without entering into technical questions concerning fleet-fighting, it seems reasonable to believe that the result would be the same if the number engaged on each side were proportionately multiplied. Superiority of speed and of number would still give the choice of position, and secure the advantage of converging fire, besides which the greater power of division and of concentration must always belong to the more numerous fleet. But if ironclads be not needed for the purpose of opposing ironclads, it is difficult to see for what purpose they are wanted at all. For every other kind of service, a numerous fleet of smaller and swifter vessels, unencumbered with armor, would clearly be preferable. To protect our commerce, to guard our extensive sea-board against invading flotillas, to lend naval assistance to our colonies in case of need,

and generally to maintain our supremacy at sea, we require a far more numerous navy than we possess, or can afford to possess, unless we vastly reduce our expenditure on individual ships, and to do this we must dispense with armor. It might, perhaps, be rash entirely to abandon armor so long as other nations continue to use it, because nothing but the experience of an actual war will remove all question as to its possible utility; but considering the indisputable value of a numerous fleet of swift and powerfully-armed ships, built with a view of obtaining the maximum amount of unarmored defense, and considering that such vessels, unlike armor-clads, can never grow much out of date, it does seem to be expedient that the chief expenditure of this country should be upon ships of that description. Lightness should be the special aim in the construction of such vessels. Steel plates should be used for the hulls, and guns and engines should be of the least possible weight consistent with the necessary power. Every ton of weight which is saved will enable higher speed to be attained, and there is probably no quality in a fighting-ship which will so much develop in importance as that of swiftness.

Messrs. Thornycroft have led the way in showing what extraordinary speed can be realized in diminutive vessels by reducing to the utmost the weight of every part of the structure and its contents; and although we cannot expect to attain proportionate speed by the same method in ocean-going ships of war, yet there can be no question that we may have far swifter ships than at present if we make lightness our principal object instead of following the previous practice of loading our ships with cumbrous armor in the vain hope of making them invulnerable. Light unarmored ships, designed by Mr. George Rendel, have lately been built in this country for foreign powers, which, with a displacement of only thirteen hundred tons, have attained a speed of sixteen knots an hour. They carry coal for steaming four thousand miles, and have already actually steamed three thousand five hundred miles without replenishing. They are each armed with two 10-inch new-type guns, which have nearly an all-round fire, and are capable of piercing eighteen inches of iron armor, and with four 40-pounders on the broadsides. It is a very serious question what we are prepared to do in the event of a number of such vessels as these being let loose upon our commerce. At present there is not a single ship in the British navy carrying an armament competent to engage them that could overtake them in pursuit, or evade their attack when prudence dictated a retreat. Confidence is often expressed in our mercantile marine being capable of furnishing, on an emergency, a supply of vessels fit to be converted into cruisers; but where are we to find, among our trading or passenger steamers, vessels possessing a speed of sixteen knots, with engines and boilers below water-level, and having an under-water deck to save them from sinking when penetrated by

projectiles at or below the water-line? From my own experience I know how difficult it is to adapt mercantile vessels to the purposes of war, and how unsatisfactory they are when the best has been made of them. It is alarming to think how unprepared we are to repress the ravages which even a small number of swift marauding vessels, properly constructed and armed for their purpose, could inflict upon the enormous property we have at all times afloat, and how little we can hope to clear the sea of such destructive enemies by cruisers improvised out of ready-made steamers destitute of all the conditions necessary to render them efficient for such a service. We must bear in mind that it is not merely the loss of property and interruption of trade that we have to fear, but also the interception of our food supplies; and that the more our population increases and our agriculture declines, the more terribly effective for reducing us to submission would be the stoppage of those supplies.

Another branch of national defense, which in a great measure falls within the province of the engineer, is that which applies to the protection of harbors. Very little has yet been done for securing our commercial harbors from attack, and it is to be feared that immense damage might be done by the incursions of hostile cruisers that succeeded in evading the vigilance of our insufficiently numerous navy. Our naval arsenals have not shared in this neglect, but the efficiency of the defenses which have been provided for their protection may well be questioned. Vast sums have been spent in the erection of ironclad forts which have already outlived that stage of artillery progress for which they were adapted, and to this day it remains a problem how to make the limited space they afford available for artillery of the necessary power. Even if they admitted of being adequately armed, it is not easy to see how large guns, crowded together in double tiers, as is the case in many of these forts, could be fired at a passing object without creating such an amount of smoke and confusion as would be incompatible with the effective service of the guns.

To render large guns effective in shore batteries they should be mounted well clear of each other, so that the smoke from one should not interfere with the sight from another, and I am not alone in my opinion that wherever the old-fashioned system of earth-work is practicable, it will be found the best and cheapest kind of protection. Muzzle-loading guns can be mounted in such a manner that they can be very easily turned and depressed, so as to be loaded under the shelter of an earthern parapet by hand-worked machinery of the very simplest description. Damage done to an earth-work by an enemy's fire admits of easy and immediate repair, while damage to an ironclad fort can only be rectified at great cost and after much delay. Guns mounted in earth-works can be rendered difficult to see, and when well separated they can bring a converging fire upon a ship, which can only be answered by a dispersive fire on her part.

A great ironclad fort presents a large and conspicuous target for convergent fire, and the veil of smoke which would envelop it would afford little or no protection against the fire of attacking ships, while its own gunners would be unable to see the objects to be fired at. The guns also in these iron forts, instead of having a free lateral range as they would have over a parapet, project through contracted port-holes, which restrict to narrow limits the lateral angle of fire, and equally contract the view of passing objects. Many of the ironclad batteries that have been erected are built as islands in the sea, where earth-works are impossible, and it may be contended that shore batteries would in these cases be too distant to command the channel; but, it may be asked, Are not floating defenses preferable, under such circumstances, to insular batteries, both in point of cost and efficiency? Gunboats, constructed as mere floating gun-carriages, can be made to carry the heaviest artillery. They would present only very small targets to the enemy's fire, and, at the varying distances at which they would be used, they would be extremely difficult to hit. They could be spread out so as to clear each other's smoke, and bring a converging fire to bear upon a single ship. They could retreat, when necessary, into shallow water, and in many cases could maintain a fire over breakwaters, which would afford them protection. Instead of being rooted to one spot like a battery, they could pursue or retreat, or unite in taking up new positions, and they could perform many services to aid or relieve a fleet. Combined with steam-launches armed with torpedoes, they would afford a flexible and powerful means of defense, and will probably still have to be adopted even in cases where iron-cased batteries have already been erected. At all events, for the protection of commercial harbors, gunboats, thus associated with torpedo craft, would be far more effective than fixed batteries of any kind, and the first step towards making our commercial harbors independent of external naval protection appears to be to furnish each of them with a sufficient number of such vessels, which might be placed in the hands of trained volunteers raised on the spot.

But no system of harbor defense can be deemed complete that does not embrace the application of submarine mines, which by electrical connection or severance, effected on shore, can be rendered explosive or harmless to passing vessels at the will of the operator. There is probably no mode of defense that would have such a deterrent effect upon an enemy as that of submarine mines, the management of which might also be intrusted to properly instructed volunteers. It would be a grand development of the volunteer movement, of which this country is so justly proud, if it were thus to be extended to harbor defense; and I am informed that so far as the use of submerged torpedoes is concerned, a project of intrusting their employment to a corps of volunteer engineers is already under consideration. The superior education and intelligence of the class from which our volunteers are mostly supplied

would especially fit them for the discharge of duties involving skill and discretion, such as would be required in the handling of electrical apparatus, and we may be sure that wherever dash was needed in the use of torpedo-boats, there would be no lack of that quality among volunteers in the hour of trial.

The subject of artillery forms a most important element in all questions of national defense, and as it is one that has in a special degree fallen within the scope of my experience, I may be expected to make it a prominent topic of this address.

Before the introduction of rifled ordnance, a gun was simply a tube of cast iron or bronze, closed at one end. The bore was smooth, the projectile was spherical, and the charge was small. Guns thus made fulfilled the purposes of the day, but when rifling was adopted, an elongated shot had to be used, far heavier than the round-shot of corresponding diameter. Rotative motion had also to be given to the projectile, in addition to the forward motion, and the increased strain due to these altered conditions was more than the old guns, when rifled, would bear. Their insufficient strength was attributable partly to the inherent weakness of the material, partly to the weakening effect of the rifling, and partly to a constructive defect which had been previously pointed out by Professor Barlow in relation to hydraulic presses. In his treatise on the strength of materials he shows that the strength of a cast-iron cylinder is far from being proportionate to its thickness, because the internal layer of the metal may, from its shorter circumferential length, be stretched to the breaking point before the external layer has nearly reached the limit of its resistance. He further shows that in order to obtain the greatest resistance to a bursting force in a cylinder the external layer of the material must be in a state of initial tension which should diminish in each succeeding inward layer until a neutral point is reached, beyond which a state of compression must prevail, gradually increasing to a maximum at the interior surface. To comply with these conditions a gun requires to be built up in successive layers, each layer being contracted upon the one beneath; and the more numerous the layers the nearer will it approach to theoretical perfection. Much mathematical refinement has been expended in the attempt to define the precise degree of contraction which should be given to each successive layer, but this critical nicety does not appear to be important, provided the contraction be on the excess side of what is mathematically correct. There is no harm in giving a hoop a little permanent stretch by shrinkage, and if the interior of the gun be more compressed than theory requires, the tendency of the explosive force is to effect an adjustment. The advantage of external tension is now universally recognized, and no large guns are made without an envelopment of initially-strained material. It is to be observed, however, that mere hoops shrunk upon an internal tube give no end strength to the gun, and the tube must in

that case be made sufficiently thick to carry the whole longitudinal strain. But since a thick tube approaches the objectionable condition of a solid gun, it is better to reduce the thickness of the tube and supplement its deficient end strength by longitudinal strength in the surrounding material. Much less strength, however, is required longitudinally than transversely, and therefore the material may, in a corresponding degree, be weaker in the direction of the length than in that of the diameter. This condition is fulfilled by the coiled iron cylinders, which were introduced by myself, and which depend for longitudinal strength upon lateral welds, but resist the more potent bursting strain by the continuous fibre of the rolled iron employed in their fabrication. The barrels of fowling-pieces had long been made upon this principle, viz., by welding a spiral coil of soft iron into a continuous tube, and that mode of construction was justly esteemed for the safety it afforded. But for the inner tube of a built-up gun a harder and more homogeneous material is required than welded iron, and I have always used steel for that purpose when I could obtain it of suitable quality, which, in the early days of my experience, was a difficult thing to accomplish.

The term steel, as now used, is a very indefinite one. Formerly it implied iron so combined with carbon as to render it susceptible of a high degree of hardening by immersion in a cold liquid; but it is now more generally applied to iron which is produced by a process of fusion instead of by one of adhesion, and in that sense it is independent of any particular degree of carbonization. Using the term in this sense, steel has the advantage over iron in being free from defects of welding. It generally contains more carbon than wrought iron, which renders it stronger. It is also tougher under some tests, but more prone to fracture under others. This tendency to fracture has been strongly exhibited where the material was exposed to the concussive action of gunpowder, and it is notorious that steel armor plates, even of the softest and toughest description, are, or at all events have hitherto been, much more easily fractured by the impact of a shot than similar plates of wrought iron. But the manufacture of steel continues to improve, while that of iron is stationary, and the time is probably near when the manufacture of iron as now practiced will entirely merge into that of steel as produced by the process of fusion.

The question then arises, What, under the present condition and prospects of steel manufacture, should be our practice as to the use of that material for artillery purposes?

As regards the internal tube, there is not, and never has been, any doubt in my mind that steel is the proper material. Iron is too soft for the purpose, and the welded junctions are easily eroded by the action of the exploded powder. I do not mean to disparage the use of a wrought-iron coil tube as a lining for old cast-iron guns, by which mode of treatment a serviceable class of rifled gun can be produced

for light work; but the success attained with guns of that description does not justify the application of a similar mode of construction to ordnance in which the highest possible power is sought to be attained. As to the material for the envelopment of the tube, the choice lies between steel and wrought iron. The only large experience in this country has been with guns jacketed with welded cylinders made of coiled wrought-iron bars, and no system of construction has been elsewhere so amply tried in relation to heavy artillery. As to the results, a comparison may be challenged with any foreign system in regard to the paucity of accidents in proportion to the extent of the firing.

But the problem is ever before us how to lessen the weight and increase the power of heavy ordnance, and we cannot rest satisfied with results, however good, if they be not the best that appear to be attainable. In saying this I am led to speak of a system of construction which has not yet passed through the experimental stage, but which, from the results it has already given, promises to attain a wide application. I refer to that system in which the coils surrounding the central tube consist of steel wire, or ribbons of steel, wound spirally upon the tube. To those who object to welded coil tubes on the ground of supposed deficiency of longitudinal strength, this mode of construction must appear especially faulty, inasmuch as lateral adhesion, instead of being, as contended, merely deficient, is altogether absent, while to those who advocate the present coil system, this variety of it must commend itself as affording the greatest possible amount of circumferential strength that can be realized from the material employed. Steel in the form of wire, or drawn ribbon, possesses far greater tenacity, and also greater toughness, than in any other condition, and in applying it to guns we have perfect command of the tension with which each layer is laid on. The idea of using wire for this purpose is far from new. It formed the subject of a patent obtained by Captain Blakeley, in February, 1855, and also of a patent taken out by Mr. Longridge a few months later, soon after which time the late Mr. Brunel conceived the same idea, and, in ignorance of the existence of any patents on the subject, commissioned me to make for him a cannon upon this principle; but as soon as he discovered that the ground was occupied by patents he gave up the project, and for the same reason I abandoned it myself. Mr. Longridge has persistently advocated the use of wire for this purpose, and has more than once brought the subject before this Institution. He has also suggested a form of gun designed with a view of obviating the objection of longitudinal strength, but I am not aware that his method of construction has been reduced to practice. Of the theoretical advantage of this system there can be no doubt, but the difficulties only begin when we endeavor to put the theory into practice, and no solution of the problem of how to do it can be accepted without the production and trial of an actual gun. My own attention was redirected to the

subject nearly five years ago, when the patents had long expired, and after making various preliminary trials with small wired cylinders, a 6-inch breech-loading gun of this construction was commenced in 1879, and finished in the beginning of the following year, since which it has undergone many severe trials. The charges used with it were large beyond precedent, and the energies developed proportionately high. Being satisfied with the results obtained with this gun, a second one, of larger dimensions, was commenced, and is now finished. Its calibre is about twenty-six centimetres, or about ten and a quarter inches. Its length is twenty-nine calibres, and its weight is twenty-one tons. In the previous gun I depended for end strength upon the thickness of barrel only, but in the new one, layers of longitudinal ribbons are interposed between the coils, in the proportion of one longitudinal layer to four circular layers. The longitudinals are secured to the trunnion ring at one end and to a breech ring at the other, and are in themselves calculated as sufficient to resist the end strain on the breech, independently of the strength afforded by the tube. The whole is incased in hoops shrunk upon the exterior of the coil, for the treble purpose of protection from injury, of preventing slipping in the event of the failure of an external strand, and of adding to the strength of the gun. This gun has already been tried, and given results which, in relation to its weight, are unexampled except by its 6-inch predecessor. Various attempts have also been made abroad to reduce this system to practice, and it is understood that the French are at present engaged in making experimental guns upon the same general principle. With regard to the ribbon form of section, I prefer it to a square section of equal area, as being more favorable for bending over a cylinder, but any rectangular form is better than round wire, on account of the flat bedding surfaces it affords.

The question whether breech-loading or muzzle-loading guns are most advantageous is one which has been discussed in a very uncompromising spirit, as if one or other of the two systems ought to be universally adopted to the entire exclusion of the other. Impartial consideration, however, will show that there is room for both systems, and that each is best in its proper place. It has been distinctly proved that, so far as accuracy and velocity are concerned, there is nothing to choose between them. Neither is there any material difference in regard to rapidity of fire; nor would a superiority in this respect on either side be of much value, seeing that it is of far more importance to cultivate careful and deliberate fire than to facilitate a lavish expenditure of the very limited supply of costly ammunition that can be assigned to each gun in active service. With regard to convenience of loading and security of the gunners, the advantage is in most cases, though not in all, on the side of the breech-loader. Guns mounted on the broadsides of ships or in casemated batteries cannot be loaded at

the muzzle by any known method without very seriously exposing the men to the fire of machine-guns and small-arms. In fact, the great length of modern guns renders it impossible to get access to the muzzle for the purpose of loading without allowing more space for recoil than is practicable in a ship, or in the usually confined space of a casemate; so that in these cases breech-loading must be regarded as a necessity. But in earth-work batteries a muzzle-loading gun can, by proper arrangement, be loaded under the shelter of the parapet more securely and quite as conveniently as a breech-loader. In revolving turrets also, a gun may be loaded at the muzzle by external means, involving no exposure of the men, and in gunboats carrying a heavy gun on the line of the keel, loading at the muzzle is also easily effected. The superior simplicity of a muzzle-loading gun entitles it to a preference wherever it can be used with equal advantage. All breech-loading mechanism is of a nature to require very accurate fittings, such as require care both in use and for preservation. Breech-loaders, therefore, are very unfit weapons for imperfectly instructed gunners, and they are quite out of place in open batteries, where they would be exposed to the injurious influences of the weather and of drifting sand. It would be folly, therefore, in such cases to use them in preference to muzzle-loaders, which require little care for their preservation and take no harm from exposure.

The various methods of breech-loading may be classed under two heads: 1st, breech-loaders with a closing apparatus worked from the side; and, 2d, breech-loaders closed by a screw inserted at the rear. In the former class a large opening is required through the gun, the continuity of which is thereby interrupted to the detriment of longitudinal strength, while in the latter class the stronger form of a continuous cylinder is maintained to the extreme rear, and the necessary end strength is obtained with less weight of material behind the base of the bore. The numerous turns which would be necessary for inserting and withdrawing an ordinary screw is avoided in the French practice by cutting away such portions, both of the inner and outer thread, as will permit of the remaining portions being engaged and disengaged by revolving the screw through a part only of a single turn. This method necessitates the use of a larger screw than would otherwise be needed, because half of the entire thread is removed; but there is no difficulty in realizing sufficient holding power with a screw of moderate dimensions when thus cut away. The system which of late years has been adopted at Elswick is that of the French cut-away screw, combined with a new cup arrangement for stopping the gas; and our government, acting upon trials made with guns supplied by my firm, are at present doing the same.

I now come to the subject of rifling, which has given rise to almost as much controversy as the question whether guns should be loaded at

the breech or at the muzzle. The sole object of rifling is to communicate to the projectile a sufficiently rapid rotation to give it gyroscopic steadiness in flight, and it is objectionable to use a quicker spiral than is necessary for this purpose. After long experience it seems to be now generally admitted that with projectiles proportioned according to general practice, which appears to be nearly the same in England and abroad, a twist not exceeding one turn in thirty-five calibres for small guns, and from that to one in fifty for large guns, is sufficient for the purpose. But if we increase the length of the projectile, a quicker rotation becomes necessary to steady it, and this involves a more rapid twist in the grooves. Rifling is said to be uniform when its pitch is the same throughout the bore. In that case the tangential force-producing rotation is a constant proportion of the pressure on the base of the shot. Therefore, the pressure on the base being greatest at first, the tangential strain is also greatest at first; and as the propelling force diminishes, so does the tangential force decline. To remedy this inequality of tangential force, and make the strain upon the grooves nearly equal throughout, it is a common practice to lessen the pitch at the commencement, where the pressure is greatest, and let it gradually increase towards the muzzle as the pressure diminishes. This is called an accelerating twist, and its one disadvantage is that it is attended with rather more loss of energy in friction than is incident to the uniform spiral; but the difference is too small to be important.

The various systems of rifling may be referred to under three heads: 1st, that in which rotation is given by studs projecting into large and deep grooves in the gun; 2d, that in which the form of the bore is adapted to give rotation by the mechanical fit of the shot; and, 3d, that in which rotation is produced by attaching to the projectile a soft material, which, by expansion in the case of muzzle-loaders, and by crushing in the case of breech-loaders, moulds itself to the form of the rifling, and stops the windage. The first, or studded system, is that which has for many years past been applied to the guns of the British service; but guns thus rifled require to be used with metallic gas-checks to prevent windage, and when these are made of a form to fit the grooves, and are adapted to grip the base of the projectile, the studs are uncalled for. The second, or mechanical fit system, is only applicable to a uniform twist. I abstain from reviving controversy on this mode of rifling, which, though powerfully advocated, has not met with extensive adoption. The third, or soft-metal system, is that which meets with most favor both in England and on the Continent. It involves no departure from the cylindrical form of bore, which is the strongest form. It admits of the grooves being numerous and shallow, instead of few and deep, which is also favorable to strength. It suppresses windage better than any other system, and it adapts itself to an accelerating twist. All the new-type guns made at Elswick and

Woolwich are rifled to suit this system, the material used on the projectile being copper, applied as a hoop for breech-loaders and as a cup for muzzle-loaders. The accelerating spiral thus used in conjunction with soft metal on the shot has this additional advantage: that in the early stage of the shot's motion, when it is especially desirable to keep the grooves closed against windage, it lessens the edge-wear on the soft metal in the grooves, and thereby tends to keep them filled with the material,—an effect which is aided by the slight distortion of the soft metal produced by the increase of pitch.

Another question, which has also given rise to much controversy, is whether we should lean towards large bores or small bores in artillery construction; and upon this subject I shall say only a few words. In judging of the best calibre for a gun it is necessary in the first place to decide the amount of powder in the charge, and how much expansive action has to be allowed to the powder gases before they are discharged. Taking one hundred and twenty cubic inches as a fair allowance for each pound of powder, we arrive at the total capacity of the bore by multiplying that number of cubic inches by the pounds' weight in the charge. It will then remain to be decided how far the required capacity shall be provided by width, and how far by length, of bore. If we increase the width, we gain capacity in the ratio of the square of the diameter; but if we increase the length, we only gain in the direct proportion of the length. We have also to be largely guided by considerations affecting the projectile. Assuming its weight to be fixed, its length will determine its diameter; so that a long shot implies a small bore. A lengthened projectile has both advantages and disadvantages. It meets with less atmospheric resistance, and therefore loses less energy in its flight. It has greater penetration because it has a smaller hole to make; but the superiority in this respect is only in proportion to the circumference, and not the area of the hole. On the other hand, the lengthening of a shot increases its tendency to crush or break on striking. Used as a shell, a long projectile contains less powder than a short one of equal weight and larger diameter, and is more liable to break by impact before explosion. Finally, a long projectile requires more rapid rotation to steady it, and this involves greater tangential strain on the grooves, and greater expenditure of power in producing rotation. The question of calibre is therefore a very complex one, and it can only be settled by a compromise of conflicting considerations. The tendency of recent practice has been rather towards a reduction of calibre; and this, combined with a large increase of charge, has necessitated the great length which characterizes the most modern ordnance, and constitutes the principal argument in favor of breech-loading.

The better knowledge which we now possess concerning the forces of fired gunpowder has greatly facilitated the recent progress of artil-

lery. Before the elaborate papers upon this subject, which were contributed by Captain Noble and Professor Abel to the "Transactions of the Royal Society" in 1874 and 1879, the distribution of strength in a gun had to be fixed in ignorance of the true pressures to be resisted in the various parts of the bore; and the modes of moderating the initial pressure of the gas were very imperfectly understood. Much has already been done, and much remains to be done, to adapt gunpowder to all the conditions of modern ordnance. In the old round-shot guns, the charge being small and the bore relatively large, the cartridge was short, and the igniting flame had a very small distance to travel in order to reach the extremities. Moreover, the spherical shot acquired velocity much more rapidly than the elongated shot of the rifled gun, and, owing to the wider bore, in relation to the length of the cartridge, given distances traversed by the shot effected larger reductions of pressure by expansion. Hence, therefore, although the powder was small in grain and completely ignited, the strain on the gun was more moderate and transitory than in the rifled bore. In it the length of the cartridge was greatly increased, and the igniting flame had much farther to travel in order to reach the remoter parts of the charge. The granular interstices were then too small to permit the flame to penetrate with sufficient freedom, and portions of the charge got jammed into solid masses, which burnt so slowly as to result in a large proportion of the powder either not being burnt at all, or burnt at so late a stage of the process as to be of little avail for propelling the shot. It therefore became necessary to abandon powder of the granular form, and make it in pebble-like pieces, which would burn more slowly and afford more interstitial space for the penetration of the flame. As guns grew larger and charges increased in length, it was found necessary to enlarge the separate pieces, until at length each one of them became a lump of powder weighing several ounces. The lengthening of the charge has gone on to such an extent that in some cases the cartridge has attained upwards of six feet in length, and the consequence is that the gas, rushing from the point of ignition to the ends of the powder-chamber, and there being suddenly arrested, produces a zone of high pressure, within which the powder burns abnormally fast. Then a back rush takes place, and a violent wave action is set up, resulting in local strains of great severity on the gun, without materially affecting the velocity of the shot. This dynamic action of the exploded charge is mitigated by slow-burning powder, but the chief preventive is central ignition, and ample flame space both through and around the cartridge. The prismatic form of powder, long used abroad before it was manufactured in England, is probably the best, so far as shape is concerned. The prisms, being perforated hexagons, pack into small compass, and afford numerous passages for flame, the diffusion of which can be further facilitated by omitting the central prism. But even this kind

of powder is subject to wave action in a long closely-filled chamber, unless the powder be of very slow-burning quality, in which case it is subject to incomplete or too tardy combustion.

Another very formidable evil attending the use of large charges of powder is the erosive effect of the products of combustion upon the bore of the gun. When a charge of powder is fired, it is converted into a mass of intensely heated gaseous and liquid matter, of which the liquid portion is more than equal to the gaseous. This highly-heated liquid, being thrown into violent motion, exercises on the bore a scouring action which seriously lessens the endurance of the gun, and sometimes endangers its stability by forming deep gutters which are liable to develop into fissures under the stress of the firing. The action is partly chemical and partly mechanical, and so far as the chemical action is concerned, is probably chiefly due to the sulphur in the powder. It therefore becomes an important and interesting question whether that ingredient cannot be dispensed with. Sulphur is undoubtedly useful to aid the ignition where small charges are used, and it probably increases the heat, and thereby augments the force, but in large charges it is desirable to repress both quickness of ignition and heat of combustion. The sulphur adds little or nothing to the gaseous products of the combustion, and, if its place were supplied by an addition to the carbon, an increased volume of gas would be evolved. If the composition of gunpowder cannot be so modified as greatly to reduce the present erosion, renewed efforts should be made to find some other explosive substance more fitted for heavy artillery. Gun-cotton and other compounds of that nature have the advantage of being almost entirely free from residuum, but, owing to the instable equilibrium of their component parts, they are liable to detonative explosion of dangerous violence. The excessive heat of their ignition might also prove an objection as tending to fuse the surface of the bore. The calculated heat of fired gunpowder is 2100° C., while that of gun-cotton is about 4500° C. Captain Noble found that platinum foil inclosed in a cartridge of gunpowder, fired a closed vessel, was barely fused, but in a cartridge of gun-cotton it was not only fused but volatilized. If means could be discovered of moderating this violence and high temperature, we might possibly find, in some compound of this kind, an explosive agent possessing all the efficacy of gunpowder, without its destructive action upon the gun. Until this is done, or until gunpowder is rendered more harmless, the use of full battering charges should be limited to those occasions on which the maximum power of the gun is actually required, either for the purposes of war or for those of experiment. On all other occasions the lighter or "service charge" will suffice, and will produce less wear upon the gun.

Had the limits of this address permitted of a complete dissertation upon modern ordnance, I should have had much to say on the subject

of mounting and working heavy guns, both in ships and shore defenses. As to the latter, I will merely remark that the difficulties which surround the problem of how best to mount the guns are much greater than is commonly supposed, and that for want of a decision on this subject some of our most costly forts, long since finished, remain very imperfectly armed. As to ships, the question of mounting modern guns is equally critical. It is certain that machinery can no longer be dispensed with for working the guns, and that engine-power must be used if we are to economize labor and avoid exposure of men. In the days of cast-iron smooth-bores the heaviest naval gun weighed ninety-five hundredweight, and it was deemed impracticable to exceed that limit in a ship. At the present time the heaviest naval gun in the British service is eighty tons, and guns of one hundred tons are carried in Italian ships. Instead of projectiles weighing as a maximum ninety-four pounds, and charges of sixteen pounds, we have now to handle projectiles of fifteen hundred pounds, and charges of four hundred and fifty pounds; and if we are to keep pace with foreign navies, we must greatly exceed those limits of weight. Even if it were possible to deal with guns and ammunition of such weights by manual labor, the multitude of men required for the purpose would be greater than could find standing-room at the guns. Up to a certain point hand-power may be so aided by machinery as to enable larger guns to be worked by men than was formerly deemed possible; but the mechanism required to render hand-labor available is quite as liable to be disabled by an enemy's fire as that which would be applied in connection with engine-power. There is, therefore, no reason in this respect for employing a numerous gun crew in preference to inanimate power. Automatic methods of running out the gun, by which the gun is lifted in recoiling by slides or radius bars, and recovers its position by gravitation, may in many cases be advantageously used to save labor, but in a ship the varying inclination of the deck interferes with uniformity of action. The upward motion of a gun also involves the objection of a higher port, and it adds greatly to the downward shock, which becomes very severe on the deck where the guns are large and are fired at considerable elevation with such heavy charges as are now usual. Steam-power, acting through the medium of hydraulic pressure, is already largely applied in recent ships for effecting all the operations of working the guns, and where such power is used there is nothing to gain by automatic action for returning the gun into firing position. In considering these various mechanical arrangements now applicable to naval warfare, we perceive the growth of the engineering element in our ships of war, and the importance of mechanical, as well as nautical, acquirements on the part of the officers, as also, in a less degree, on that of the men. Breech-loading guns, carriages fitted with all modern appliances, shot and powder lifts,

mechanical rammers, and torpedo apparatus, all combined with steam or hydraulic machinery, or with both, constitute mechanisms requiring to be supervised by officers qualified as engineers, and to be handled by men trained in the use of machinery.

I must now draw to a conclusion; but, in the hope that your patience is not yet wholly exhausted, I shall, before closing, advert to a subject of grave national importance. Our navy is at present armed with guns which could not be expected to contend successfully with the best modern guns that could be used against them. Happily, most of the older ships of foreign powers are in the same predicament; but all their new vessels, and some of their older ones, are being armed with artillery which, weight for weight, is far superior in power to that of our navy. Our service guns have simply been overtaken in that rapid progress of artillery which has been going on for the last eight or ten years; and it may be doubted whether any partial remodeling during that period would have averted the present need of re-armament; while it would certainly have involved great sacrifice and confusion of ammunition and stores. But a new departure cannot longer be delayed. An irresistible demand has arisen for breech-loading guns, and it is imperative to combine, with the introduction of that system, such other modifications of construction as will realize the increase of power which we now know to be attainable.

It may, however, be asked, What better prospect of finality have we now than we had ten years ago? As to absolute finality, it will probably never be reached, but the country may take some comfort in the reflection that every stage of progress narrows the field for further development. There is already no substantial room for improvement in the accuracy of guns; and as to power, we are nearly approaching the limit at which severity of recoil and extravagant length of gun will prohibit further advance. We may go on building larger guns almost without limit, though I doubt the policy of so doing, but mere increase of the size does not revolutionize system. There seems, therefore, to be more hope of permanency now than at any former period; but, whether this be so or not, we cannot, without danger, remain passive.

What, then, should our government do in regard to the great work of re-arming the fleet? I take it for granted that all new ships will be armed with the best guns that can now be made, and that the more important of the older vessels will speedily receive the same advantage; but beyond this, so long as experience of novelties is deficient, it is a case for cautious procedure. In the mean time, no expense should be spared in judicious experiments, seeing that the expense of experiments is trifling in comparison with that of mistakes. Above all, the government should pursue such a course as will bring into full play the abundant engineering resources of this highly mechanical country for increasing the efficacy of our national defenses.

WINNING HIS SPURS.

(Continued from page 333.)

V.

TWENTY miles up the valley above Camp Sandy lay the agency of the Indian reservation, and for some time previous to the date on which our story opens a young cavalry officer of large experience among the Apaches had been doing the double duty of commanding the Indian scouts and acting as agent for the six or seven thousand aborigines then being fed and clothed at the expense of the government. Of course there had been, previous to his time, an actual (*bona fide* was almost written) Indian agent, one of the factors of that mysterious and complicated piece of cabinet-ware known as the Bureau, but, though this was before the halcyon days of Schurz, even the Department of the Interior could not close its eyes to the convincing proofs of the peculations which he had been so injudicious as to strive to keep entirely to himself, and so, having proved a doubly unprofitable servant, the Bureau was not unwilling to cast him out, whereupon he showed signs of insanity, was placed under medical care, and escorted back to his home in Massachusetts under the guidance and at the expense of Uncle Sam, the method of his madness subsequently manifesting itself in the realization that had he been discharged on the spot he would have been compelled to pay his own way. Then there was an interregnum. Even Indian agents could hardly afford the trip to Eastern Arizona, the journey to San Francisco and thence by sea or desert to the Colorado, and thence by "buckboard" to the mountains, costing more for self and family than one could possibly hope to save in a year without getting found out. "If it were not for those d—d army officers," said one of these shrewd financiers, "a man might live like a gentleman even in Arizona." But the commanding general had for years of his life been dealing with Indians, and his maxim was to fight like blazes when fighting had to be done, teach them to dread the power of the Great Father, but to promise and insure fair treatment when they surrendered. The general had promised these Apaches fair treatment, and was bound to see his promise carried into effect. This led to his keep-

ing an eye on the agents, and that led to the agents hating him worse than one of their own inspectors, which, after all, is a mild way of putting it. Nearly all the Arizona agents about this time were doctors of something or other, and bore the title if for proficiency in no other art, science, or profession than that of "doctoring" returns, and when this particular doctor was taken crazy and home (where he took to lecturing on the wrongs of the red man, and to himself the contributions of the charitable), the general was empowered to name a *pro tempore* agent, and sent Lieutenant Stryker of the —th. Stryker was well known to all the Apaches as a fearless young chief who had thrashed them many a time, and the one thing an Indian respects is bravery, when combined with force. As a consequence there was peace and propriety on the reservation. Stryker kept rigid account of the warriors under his control; there was little or no straying away from the limits, the few settlers began to take courage and let out their stock to graze, new "ranches" began to spring up in the deep valleys, and all promised well until the arrival of another "ringster" from the East relieved Stryker of his duties, and the Indians of restraint. Still there had been no outbreak; the road between Prescott and the valley of the Sandy, though lying dangerously near the Apaches, was considered so safe that the mail-carrier rode to and fro without escort, and small hunting-parties scoured through the mountains without meeting a "hostile"; but for some weeks past unpleasant rumors had been in circulation, and for three or four days the agent had been sending down to Sandy sullen-looking specimens of the tribe, with the request that they be confined in the guard-house, among the murderers and worst characters of their brethren lodged therein. The guard reported that they were holding frequent pow-wows in the prison room, and that when out at work under the sentinels, occasional attempts had been made by them to steal knives, scrap-iron, and any odds and ends of metal that could be sharpened and used. Stryker had been sent to the southern part of the Territory, and none of the officers at Sandy knew anything of the new agent. The surgeon at the reservation, however, had twice been down to the post, and on both occasions had displayed keen anxiety as to the condition of affairs. He even asked Colonel Pelham to come up and take a look at things, saying that at the rate he was going on the agent would precipitate a mutiny in less than a fortnight,—he was arresting and ordering into confinement some of the best and most influential Indians on no pretext whatever, and what was worse, said the doctor, "he is making them believe it is by your order or that of the general." Pelham had decided to lay the whole matter before the department commander in a written communication,—but the result was as yet unknown, as the general could not interfere with the proceedings of an officer of the Interior Department, and could only "forward" the statement with a strong indorsement, in which case it generally resulted in

being pigeon-holed among the musty files of the Bureau, and the informant was the only one who got into trouble.

And so it happened that the solitary ride on which Jack Truscott had set forth proved an eventful one. Along towards two o'clock in the afternoon he had stopped to water his horse at a little spring well over towards the valley of the Agua Fria, loosening the girths and easing the saddle awhile to rest his pet "Apache." The horse was a noble specimen of his race, tall, sinewy, almost gaunt in build, but with powerful limbs, an eye full of fire and intelligence, and the tapering, sensitive ears of the purest breed. Truscott stood with his left arm thrown negligently over the withers, stroking the glossy mane, and softly patting the sturdy neck of his friend, all the while talking caressingly to him, while "Apache," having indulged in a dozen long-drawn swallows, was now, with uplifted head and dripping muzzle, taking a leisurely survey of the scene preparatory to another dip. Satisfied apparently with the tranquillity of his surroundings, he was about to return to the sparkling water at his feet, when the leaves were stirred by a faint, rustling breeze, and suddenly he threw up his head and with dilated eye and nostril gazed fixedly into the thicket near him. Next he gave a start, snorted as though alarmed, and sprang back towards the road. Truscott's quick hand was on the rein in an instant, while with his right he as quickly unslung the Henry rifle, that swung, Arizona fashion, athwart the pommel, still speaking gently, soothingly to his horse. "Steady, boy! steady, old man! you don't scare as a rule; what do you see, sir?" and with his rifle at ready the adjutant backed slowly from the thicket, stepped to the near side of his horse, and then deftly reset and "cinched" his saddle. Still "Apache" quivered with strong excitement, and Truscott, keeping his eyes fixed on the quarter from which his alarm seemed to come, led back to the road; there he stopped to consider. "Apache" still stamped and snorted, a thing he had never been known to do under ordinary circumstances, and his conduct was a puzzle. He had seen, smelled, and chased bears without special emotion before, and no other beasts of prey were to be found around Sandy, —rattlesnakes were plenty, but not a whit did "Apache" mind them, but the one thing he hated was an Indian. Could it be that Indians were crouching in the tangled brushwood back of the spring?

Truscott slung the reins over a stumpy little cedar, cocked his rifle, and, bending low, stepped over the brook and, parting the interlacing branches, forced his way through the bushes. Something wet and slimy on his hand caused him to raise it to the light, and he found it stained with blood. Close examination showed fresh gouts of blood on the leaves and twigs on either side, then came a little patch of sunlight, a mere break in the thick tangle of shrubbery, and there, stripped, gashed, mutilated,—two arrows still sticking out from the brawny back showing the shots were from the rear,—lay the corpse of Finnegan, the mail-car-

rier; horse and equipments, arms, ammunition, clothing, and boots, all but the ghastly life-ridden frame, gone. Further search revealed the soldier's blouse and shirt, so hacked with knives and stained with gore as to be useless even to an Indian, while among a pile of rocks were scattered the letters and papers of the mail for Sandy. Five minutes more and Jack Truscott was speeding down into the valley to the west, sparing neither spur nor word, and "Apache," nerved to excitement, was making the best time known to Arizona records.

The winding, rocky road lay for a distance under hanging cliffs and boulders, and Truscott, bending low over the pommel with his Henry advanced on the right, peered warily ahead at every turn. A few miles farther, down in the open valley, lay a ranch where travelers and teamsters were accustomed to rest and refresh themselves and their cattle. The next turn would bring him in view of the valley and the ranch itself, and with keen anxiety he gazed as "Apache" bounded over the road. Another moment and the bend was reached, the valley lay before him, and plainer than ever before there stood the ranch, a glare of flame, while a thick cloud of smoke, black and heavy, floated slowly into the air. Never drawing rein he darted ahead; he knew that a party of cavalrymen from the post were out repairing on the line of the military telegraph, that they were on the western side of the range and could not fail to see the conflagration down in the valley; he knew that a few strides more would bring him to the point where the road and the telegraph line lay side by side, for the latter had been strung across country by the most direct route, and between the Agua Fria and the Sandy ran far south of the winding highway. The sergeant in charge of the party was an Irishman who bore an enviable name for bravery and efficiency in Apache warfare, and Truscott felt sure that he and his men would not be far away when there was need of his services. "Two to one the sergeant has seen that fire long before this, and he and his men are well on their way," was his reflection as he galloped on.

He was among the foot-hills of the western slope now; the road dipped and twisted among the spurs, sometimes in plain view two miles ahead, sometimes not a dozen yards. At a sharp bend "Apache" suddenly swerved violently to the left, and Truscott reined up alongside the smouldering remains of a wagon, near which, gashed and hacked with savage fury, lay the body of a Mexican teamster. The cattle had disappeared, driven off to the northward as the trail indicated, but examining the ground, Truscott saw to his joy the fresh imprint of a score of horse-shoes, crossing the road from the south, evidently in pursuit. Once more "Apache" felt the spur and darted west along the road,—once more his rider came into view of the ranch, and saw with satisfaction that while the sheds and "corral" were a mass of flames, the home of the station-keeper was still safe. The one thing now was to find the sergeant and his men and hie to the rescue. Truscott lost

no time by following the trail; he knew well that before this the flames had been seen, and the troopers were taking the shortest line across country towards the point of danger, if, indeed, they were not already there. Five minutes more and now a gently-sloping stretch of road, only a mile or so, lay between him and the ranch, and then—hurrah! off to the right he saw a little squad of blue jackets bounding over the slopes with carbines advanced, and Jack's voice rang out through the still air, "This way, this way, sergeant; make for the road!" and never drawing rein, he spurred ahead. Now he could hear the crackling of the flames, and every now and then the report of a rifle. Another moment, and scurrying off towards the reservation he caught sight of a party of some twenty Indians, running for dear life, throwing away the plunder they had picked up, clinging to the tails and manes of the few horses their luckier comrades had secured; away they were going, caught in the very height of their devilment, no time to palaver or parley, their hands still stained with rapine and murder,—the cowardly curs had suddenly caught sight of the little band of rescuers, and their first impulse was flight. Truscott turned in his saddle, waving his broad-brimmed hat to the men spurring along behind him, "Head 'em off, men; spread out to the right!" and in another instant "Apache's" hoofs thundered through the burning corral, past the scorching ranch, whose beleaguered occupants found time to cheer with delight as they dropped their rifles to rush for buckets and water, out through the open court beyond, splash through the rivulet, scramble up the bank on the other side, and Truscott was in full view of the chase. But horses were well-nigh exhausted now, and eager though the riders might be, it was pitiful to hear the gasp and groan with which the steeds made answer to the spur. The mounted Indians were plainly seen striking at their comrades, who, clinging to their mounts, impeded their flight, and some of the troopers, trusting to luck, had opened a long-range fire at the pursued. But "Apache" kept on, fire, mettle, endurance, and speed, all were combined in his glorious race, and almost before he realized it Truscott found himself closing in upon the stragglers.

Throwing away the arms they dared not stop to use, two Indians flung themselves flat upon their faces on the sward; but another, wheeling quickly, knelt, aimed. Truscott bent low upon his horse's neck, and the harmless flash of the savage's rifle was answered by a surer shot that sent a bullet crashing through the tawny, naked breast. Then there came another report, sharp and ringing, close at hand, and with it poor "Apache" wavered, staggered, plunged headlong to his knees and rolled in agony upon the turf. Truscott alighted, cat-like, on his feet, but quickly knelt to avoid the hurried missiles sent back at him by the scattering foe. He ground his teeth in bitter rage as he saw his favorite lying there in his death-struggle, and with vengeful eye drove

shot after shot at his slayers, and not till the sergeant and his men could reach him did he know or realize that the blood was streaming down his left arm, and that an arrow had torn a deep rent under the shoulder-strap.

There was no further pursuit: horses were exhausted, and few white men afoot can catch an Apache; but four of the tribe had paid the forfeit of their crimes and lay weltering along the trail. Slowly the victors returned to the ranch, where the owner, a sturdy Norwegian, and his good wife, with eager volubility, poured forth their thanks for the timely rescue, and brought water and bandages for Truscott's shoulder. One or two bucolical-looking Swedes were still dashing water against the adobe walls, as though the now smouldering ruins of the corral-sheds could communicate flame to dried mud, while in one of the rooms two teamsters, badly wounded but worse scared, were stretched upon the floor groaning lustily in their distress. Close by the corral lay two more Tonto "bucks," who had presumed too much upon the easy victory over single and unprepared victims, and had ventured with reckless confidence in their overwhelming force to attempt a rush upon the stout-hearted ranchmen. Olson hurriedly told the story of their raid as known to him: how, long before noon, a small party had strolled in to beg for something to eat, and were noticed peering about at the interior of the ranch; how his wife had snatched away a rifle one of them had taken and was eagerly examining; how, later in the day, a trapper rode by from the east, saying he had seen numbers of 'Patchie tracks among the hills and didn't like the looks of things; and finally, how, after two o'clock, the two teamsters had come tearing in on one horse saying that the Indians had attacked them in the cañon among the foot-hills, and they had to flee for their lives, then came the Indians themselves. He "thought there must have been a hundred of them," some dressed in soldier clothes, some on horseback, and he and his people had run for the house, which they placed in as defensible a state as they knew how, and fought them back like heroes, according to the good man's story, though, from the fact that few of the Apaches had fire-arms, and only two of them breech-loaders (which they had secured at the expense of poor Finnegan and the Mexican that morning) and that the household was still quivering with excitement, Truscott concluded that their relief at his appearance was the most genuine portion of the entire exhibit. The Apaches had not made a very determined assault, and the besieged would hardly have held out against one.

It was not probable that another attack would be made that afternoon. The sun was well down towards the west by this time, and Truscott decided, as soon as he could rest his weary horses, to push in to Prescott with the news. A wagon was filled with straw, in which the wounded teamsters were carefully laid. Two of the cavalry horses,

refreshed by a two hours' halt and a hearty feed, were harnessed in, and, leaving the sergeant with two men at the ranch as guard, the adjutant and a little party of three "effectives" set forth at sundown with the wagon-load of wounded.

The road was rough, the night, though still and starlit, was dark in the deep pine forests through which they rode after leaving the Agua Fria. Off to the northeast the signal-fires of the Indians told the story of the outbreak, and the highway was deserted. It was near three o'clock in the morning before Truscott reached the post, turned over his wounded to the care of the hospital steward, and went to headquarters to make his report. The ball was still in progress, and the strains of gay music fell upon his ear as he climbed the slope towards the offices. Lights were burning in the telegraph-room, however, and here he found the operator clicking away at his instrument. "My God! lieutenant," said he, springing up; "we've been mighty anxious about you. The Apaches have raided the valley,—just got the news from Sandy half an hour ago, and particulars are coming in every minute. Hold on one second until I tell Sandy you are here."

Stiff, chilled, and tired, smarting with pain from his torn shoulder, Truscott sank into a chair; his thoughts drifted back over the events of the day, but lingered with keen, and even bitter sorrow on "Apache's" death. For three long years he had been Truscott's one pet, his pride and delight. He had borne his rider gallantly that day over hill and dale, rock and rill, a wild rush to the rescue; he had distanced all competitors; was the only horse "in at the death," thought poor Jack, and as he recalled that mute appeal in the glazing eyes of his favorite, and recalled too that not once before death put an end to his misery had there been a chance for a single caress or word, not one sign to his faithful charger of the love in which he held him, Jack's pale, set face grew paler, there was an odd quiver about the stern lines of his mouth, and a gathering film in the tired eyes he so hastily covered with his hand. Quick steps came bounding up the pathway, across the narrow piazza, and Colonel Wickham entered with the aide-de-camp. "Well, what's the latest? Have they heard from Truscott?" was his immediate question.

The operator motioned towards the sitting figure with one hand, while the right kept busily clicking its message, and Truscott, rising, stood before the questioner, who eagerly grasped his hands. "Safe, Jack, thank God!—but you're hurt! Where did you run across them? D—n it, what a time to ask questions! We've had an awful scare about you. Sit down again, man. Here, Bright, run down to the club-room and bring me some whisky." The aide was off without a word, and by the time he returned with the required stimulant Wickham, who never used it himself, but knew when it was needed for others, had told Truscott that at midnight a dispatch had come from

Sandy saying that raiding-parties of Indians were in the valley, and that all the settlers had taken refuge at the post. "The general said to keep the thing quiet until we received further particulars, and sent orders to have the cavalry at Camp Sandy out at daybreak on the trail. From midnight up to half-past two reports came of the Apaches being in force along the valley, but not until half an hour before had anything indicated that they were west of the range. Then a ranchman from the Agua Fria had ridden post-haste into the quartermaster's corral saying that Olson's ranch had been burned and his family slaughtered; that lots of teamsters had been killed; and then we thought of you. I hurried off a message to Canker, who replied that you had left the post about ten o'clock, and he 'feared you had gone alone.' Then the general ordered 'G' Company out at once, and the men are stirring up now. All the time though we were trying to keep the thing quiet so as not to spoil the Pelhams' ball, but just five minutes ago old Catnip and that lovely daughter of his—By Jove! Truscott, there's a girl to make your head swim—came at the general with point-blank questions about you, and I don't see how we could have kept it much longer."

Then Truscott briefly reported the facts as known to him. Bright, the aide, went off to notify the general, and came back saying that the general begged Truscott to come at once to his quarters, and there Jack found an anxious group, consisting of the department commander, Colonel Pelham, and three or four captains of the —th, and after warm greetings and congratulations the adjutant again recited tersely the story of his ride. The general listened intently, never interposing word or query until it was finished, then it came. "How did you happen to have no orderly?" and though for a brief instant Truscott hesitated and looked embarrassed, he replied gravely that "an orderly had not been considered necessary, everything had been so quiet for months past," and his comrades at least felt pretty certain that in virtually taking upon himself the responsibility Jack Truscott was shielding a man who would have lost no opportunity of hurting his defender, could he have done so. The general's orders were prompt. The cavalry officers from Sandy were directed to make immediate preparations to return, escorted thither by the troops then saddling, and with hurried farewells they went off to attend to the matter. At the general's request the colonel and Truscott remained. "The ladies must all wait here at Prescott," he said. "Let Canker and 'the boys' have this tussle to themselves, Pelham, they will scatter and whip them back in short order. You and Truscott must wait here a day or two. Now, first thing, Truscott, I want your shoulder looked after. You are to stay with us. The doctor will be here in a moment, and I'll show you your room." Truscott begged to be excused; he knew that the house was full of the fair sex, or would be as soon as they returned from the ball.

Even then their silvery voices and laughter could he heard on the walk outside, and the adjutant was far from indifferent to his personal appearance. Just now, covered with dust and his uniform stained with blood, his face haggard with pain and fatigue, he would have much preferred going off to his bachelor comrades; but even as he was attempting to enter his protest the door opened, and Mesdames the General and Pelham, escorted by Lieutenants Hunter and Ray, came sailing in. "Pretty men you are to desert your wives in this way," vociferated the portly partner of the general, all in a good-humored glow after her pull up the hill. "Pretty men to—— Why, Jack Truscott! When did you get here? Why, you're so pale—and all blood—are you wounded? What's happened?" And so, hurriedly and disconnectedly, this good lady—"the warmest-hearted woman in the army," the Arizona exiles used to call her—poured forth question, sympathy, and welcome all at once upon her prime favorite, the adjutant of the —th.

"Now don't bother Truscott," the general vainly interposed. "The doctor's coming, and I want his shoulder dressed, or he'll be having fever in it;" but his better half could not be suppressed, and over again, quietly and smilingly, Jack strove to tell something of the day's adventures, but failed signally, because by this time both dames were popping questions at him quicker than he could singly answer either. Ray and Hunter stopped only long enough to grasp his hand, and learn from their colonel that their companies were under orders, when they hurriedly left. The tramp of hoofs and jingle of Mexican spurs was heard in front, staff-officers came quickly and quietly in, received their instructions as quietly from the low-voiced general, and were off in a moment about their business. Pelham seated himself to write a few words of caution to Canker, who was a reckless and impetuous campaigner, whatever might be his disagreeable qualities, and Truscott, breaking away from his female inquisitors, had just stepped to the door to intrust this dispatch to Bright, when he came face to face with Grace. It was almost a collision. Truscott stopped short, bowed low, and with a courteous "Pardon me," held the door open for her to pass. Grace bent her flushed and tearful face, sweeping one quick, furtive glance from under the long lashes at the tall soldier, stepped into the hall, and hearing many voices in the parlor, darted up the stairs to her room, there to bathe her eyes and collect her startled thoughts.

Finding Bright already gone, Truscott carried the dispatch to headquarters, gave it to Captain Turner, and then, feeling weak and weary, returned slowly to the general's. The tear-stained face of the graceful girl who had swept past him at the doorway had by no means escaped his attention. He knew well that it was Grace Pelham, felt thoroughly satisfied that the footsteps bounding away into darkness as he came out upon the piazza were those of Glenham, had quickly decided that it

was more than probable the latter would not care to see him just then, and so had not called after him and saved himself a fatiguing trip. Returning to the parlor, he was seized by his colonel. "*Now*, Truscott, I want to introduce you to my daughter. Never mind your dress, man; I *want* her to see what my fellows have to go through. She'll like you all the better, or I'll disown her." And, pale and half faint, Jack was led up to the group of ladies, and in another moment was looking down into the most glorious eyes he had ever seen, into a fair, frank face that met his gaze with an expression of earnest interest and concern, while a slender white hand cordially greeted his nervous palm, and a gentle voice exclaimed, "It doesn't seem possible that you and I have never met before, Mr. Truscott, father's letters have made me feel as though I knew you." What man would not have thought her welcome both gracious and graceful? What mamma, with ambitious projects of her own, would not have shown alarm? Lady Pelham barely gave Jack time to offer any response before she burst in with, "Now, Grace, Grace, Mr. Truscott is utterly exhausted; too much so to talk, and (with cheerful irrelevance) I know that your father and he have a dozen things to attend to."

"Not a bit of it," said the colonel. "He shan't do another stroke of work to-night. I want him to get to bed, but, first of all, to meet Grace. Ah, Truscott, she could ride 'Apache,' I'll warrant you."

Grace, looking up into the calm features of her new acquaintance, marked a sudden change, a deeper pallor, a knitting of the tired brow, and a nervous twitching at the corners of the mouth. "Miss Pelham's riding is something the last year's graduates never tire of talking about," he answered; but she thought only of the pang that seemed to shoot across his face, and eagerly spoke,—

"You must be suffering from your hurt, Mr. Truscott. Surely you ought to see the surgeon," and this at once brought the general's energetic lady to the rescue, even Mrs. Pelham promptly joining in the sympathizing chorus. Jack was remanded to his room, whither the general himself insisted on accompanying him; the doctor, already summoned, was soon on hand, and the ladies Pelham were left alone. Without a moment's hesitation madame took her daughter's hands in hers, looked searchingly into her face, and said,—

"Grace, you have been in tears. Has Arthur Glenham spoken to you?"

"Yes, mother."

"My darling child, I knew it!" And the maternal arms were thrown about the slender form, and an anxious kiss was pressed upon the pale forehead. Then,—"And you answered him?"

Grace paused a moment. She well knew her mother's ambition, and her love for all the good that money can bring. She knew how hard she had struggled, planned, pinched, and saved that she, her

one daughter, the very apple of her eye, should never lack for even the luxuries of life. She loved her tenderly, yet those half-spoken words of Glenham's had given rise to a painful suspicion. She raised her eyes to her mother's face, and replied,—

"I do not love him. I could not accept him, mother. I have tried not to encourage this avowal. Have *you* ever spoken with him? You surely have not let him keep up this delusion. I told you at West Point it was useless."

"Grace, my daughter. Think a moment what you are doing. He is a gentleman. He loves you devotedly. He can place you above any possibility of want or care in this world. You may never have such another opportunity. Why, my child, were your father to die to-morrow you would be penniless. Your brothers could do nothing for you. Is it possible you can be blind to our position?"

Slowly Grace Pelham drew herself from her mother's arms and stood thoughtfully before her. "Do you expect me to marry a man whom I merely like?" she asked.

"But why can't you love him?" broke in her ladyship, impatiently. "It will come soon enough, Grace; you are too sensible for mere romance. Why, to-night, when I saw you enter in tears, my heart was thankful. I thought of course they were due to anxiety and distress at his sudden summons to join his company. *Why* were you crying, I should like to know?"

"At his emotion. He seemed so—so—— *Mother*, answer me: had you given him cause to hope that I loved him?"

Mrs. Pelham hesitated. She knew her daughter's spirit, her keen sense of honor; she strove to find an answer that might evade the issue, yet satisfy the scruples of her child, but Grace's clear eyes were fixed upon her face. She reddened, then almost pettishly broke forth,—

"Of course I did not absolutely encourage him, but I did say you were too young to know your own mind, and I'm sure I hoped you would come to your senses by this time. Grace, it is undutiful in you to question me like this. I'm sure I acted for the best, and he deserves better treatment at your hands."

Grace Pelham pressed her hands upon her temples. Less than a year ago, and again, less than six months, when their coming to Arizona was first discussed, her mother had told her that she had never spoken of the matter to Mr. Glenham; and now—for one moment she looked wonderingly, wistfully, into the flushed and angry face of the elder lady, then, with one half-stifled cry, "Oh, mother!" she fled to her own room.

Half an hour afterwards—a half-hour spent in bitter tears—she heard her father enter the adjoining room, and address his better half in his usual cheery tone: "It wasn't the wound that made Jack Truscott so miserable. His pet horse was killed under him in the fight,

and he never said a word about it. Why, Dolly, you look used up. What's the matter?"

And Dolly replied in melodramatic grandeur, "Hush!"

Fatigue, excitement, distress, all had spent their force on Grace Pelham. Gentle sleep soon came to soothe her troubled spirit, but, mingling with her last thoughts those words floated through her drowsy brain, "His pet horse was killed under him, and he never said a word about it."

(To be continued.)

EDITORIAL NOTES.

Our system of administering military justice has its faults, but the carping spirit shown by many of its civilian critics is hardly calculated to lead to its improvement, owing to the manifest unreason and injustice which their criticisms display. The case of Sergeant Mason is one in point. It so happened that just as a court had been ordered for his trial a general exchange of posts between the regiments garrisoning the Atlantic and the Pacific coasts was begun, and this necessitated a certain delay in convening the court and a change of the officers composing it. This delay formed the text for numerous strictures on the dilatoriness of military judicial proceedings, and of suggestions that the military authorities were in sympathy with the maudlin sentimentality that sought to extenuate or condone the offense of the accused. Now that Mason has been tried and sentenced, the same parties who were so querulous of the delay in bringing him to trial are equally censorious of the harshness of his punishment, and in more than one quarter, where better knowledge ought to prevail, the fact that he has been tried by court-martial at all is harped upon as an outrage upon justice and a subordination of civil to military law. Such people are hard to suit. A graver military offense than Mason's could scarcely be conceived of, and his sentence is fully as light as the circumstances warrant. It is to be hoped that no misplaced clemency will mitigate or undo it, but that it may be sternly enforced, and that its example shall be so potent that never again in our military annals shall be recorded an instance of a soldier so far forgetting the high trust reposed in him as to attempt the life of a prisoner he had been set to guard.

The claim that the trial of Mason by court-martial was a subordination of civil to military law is wholly untenable. Like all military persons, Mason was subject to two jurisdictions; his act was an offense against both, and he was amenable to trial by both. Had he fired at Guiteau at a time when he was on leave of absence from his station his offense might properly have been considered solely as an assault with intent to kill, and he should in that case have been arrested and tried by the civil authorities; but the same act committed while on duty in his military capacity, besides being a crime against society, was clearly conduct to the prejudice of good order and military discipline, and as

such was a military offense, cognizable by court-martial. The well-settled rule of law as to priority between jurisdictions in cases of this sort is, that whichever first fully attaches takes precedence of the other, but does not exclude that other's right to deal with the offender in its turn. Conviction or acquittal under either jurisdiction could not be pleaded in bar of trial under the other, for the one act may constitute an offense against both. Mason is still liable to trial and punishment by the civil authorities if they so elect, and the people who see in his case a subversion of the Constitution may give their perturbed souls a rest.

THE letter recently received from Chief Engineer Melville, of the ill-fated "Jeannette" expedition, by his wife, seems to extinguish the last ray of hope for the safety of Commander De Long, Dr. Ambler, and the nine men of the "Jeannette's" crew, whom the last accounts which had been received here left in great distress for want of food, five months ago, on the banks of the Lena. Melville writes, "I have telegraphed asking to remain and search for De Long and the others who perished at the mouth of the Lena River." Although he gives no glimpse of the particulars, it will be observed that he speaks in terms of entire certainty of the fate of his gallant companions, and as he is represented to be a man careful in his use of language, it would hardly seem that there could be any doubt that his words proceed from knowledge rather than conjecture, while the apparent baldness of his statement of a fact so sorrowful would also indicate that he supposed Mrs. Melville and the public to have already received intelligence of it.

Another letter from her husband, given to the public by Mrs. Melville, dated at San Francisco, July 6, 1879, just on the eve of the "Jeannette's" departure, clearly predicts the fate that afterwards befell her. "Some of us may weather it, but I am sure the 'Jeannette' will never come back. She will never stand the ice," writes Melville. If such was the impression made upon a competent judge by the vessel to whose stanchness was to be trusted the lives of such men as De Long and his companions, it seems to us to be a very pertinent inquiry, why such a risk was ever permitted to be incurred. If we have not seen the last of the attempts to penetrate the ice-locked recesses of the Arctic regions, let us at least hope that our government will assume sufficient of the paternal character to forbid hereafter its naval officers from participating in Quixotic expeditions undertaken, as was the "Jeannette's," mainly to advance private and selfish interests.

IN presenting the bill making appropriations for the support of the army for the fiscal year ending June 30, 1883, the Committee on Ap-

propriations, through Mr. Butterworth, its chairman, submit a report in explanation of the bill, from which we extract the following:

The increased appropriations over the law for 1882, recommended in this bill, are for purposes and in amounts as follows:

For expenses of recruiting, etc.	$5,000
Subsistence department	50,000
Purchase of horses for the army	20,000
Transportation of the army	50,000
Purchase and manufacture of clothing	300,000
For engineer department at Willet's Point (new building)	5,000
For manufacture of metallic ammunition	20,000
For cartridges, cartridge-cases, etc., for target practice (new item)	100,000
Purchase and manufacture of ordnance stores	10,000
Infantry, cavalry, and artillery equipments	10,000
Horse equipments for cavalry, etc. (new item)	50,000
For powder depot, grading grounds, etc.	50,000
For manufacture of arms at national armories	100,000
Total increase	$770,000

The items in which a decrease is recommended under the law of 1882 are as follows:

Pay for the army	$48,602	
Army medical museum	2,500	
Total decrease		$51,102
Net increase over law for 1882 recommended in this bill		$718,898

As we go to press we learn that the Supreme Court has affirmed the decision of the Court of Claims in the case of Captain Richard W. Tyler, U.S.A., thus establishing finally the points contended for, viz.: That the percentage increase allowed by law to officers of the army for length of service shall be computed upon the whole amount of yearly pay, including accrued percentage increase, and not upon the bare pay as has heretofore been the practice; and, further, that in making such computation, service on the retired list shall be counted the same as active service. The argument on the part of the appellee in this case was made *in propria persona*, and abundantly proved that Captain Tyler, although he modestly disclaimed being a lawyer, possesses talents that fit him to shine as well in the forum as on the field. To his pluck, perseverance, and eloquence his brother officers owe it that rights which they have long claimed, but which have been denied them by arbitrary administrative rulings, have at last been authoritatively established.

SERVICE LITERATURE.

We had occasion some time ago to call the attention of the services to General Norton's valuable work on Heavy Ordnance and Small-Arms. We are glad to find that the favorable reception accorded the work has induced the compiler to issue a second edition, a copy of which we have received, and which we find contains important additions, both to the letter-press and plates. The present is an opportune moment for the appearance of such a work. Public attention is now directed towards the question of our defenses, and also to the subject of the proper system of heavy guns. These matters are referred to by General Norton very extensively, and methods of construction are explained and illustrated. The wonderful extent of the inventive faculty of our countrymen in gun manufacture is well shown in the descriptions given of the Peabody, Remington, Winchester, Whitney, and Hotchkiss rifles, also of the Colt and Smith-Wesson pistols. General Norton's work is an important addition to military literature, and should be in all our public and private libraries.

D. Van Nostrand has received a small supply of Sir Thomas Brassey's new work on Armored and Unarmored Ships. It is a very handsomely gotten-up book, containing 648 pages, royal octavo, with colored frontispiece, 311 illustrations, 24 full-page plates, and 14 folding plates. It is sold at the low price of $5. A second volume will be ready soon which will not contain so many illustrations, and will be sold for about $2.

L. R. Hamersly & Co. have issued Wilhelm's "Military Pocket-Book," a little volume which, within the compass of something more than 200 pages, 3 by 4 inches in size, contains a vast amount of practical information about matters which are constantly challenging the attention of military men. Its portability and comprehensiveness make it invaluable as a ready reference book. It is neatly bound in flexible covers of Russia leather, and is amply illustrated. Its price is $2.

Lieutenant Regan's Manual of Guard Duty and Kindred Subjects, despite its variation in some particulars from the Tactics and Regulations, is being received with general favor by the Army and National Guard. Its subjects are of vital interest to all soldiers, and officers ambitious of being thoroughly informed on this comprehensive branch of professional learning will derive profit from its careful perusal.

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